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AGRICULTURAL PRICE POLICIES IN WAR TIME*

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PRICE policy for American agriculture in time of war cannot be discussed separately from the question of general price policy for the United States. If the general program is to be one that allows incomes of various economic groups to be determined by their competitive position, then agriculture is entitled to take considerable advantage of its competitive position. If the general program is to be one that blocks income-increases as a matter of general principle, but that allows increases of income for such groups as can persuade Congress or certain administrative authorities that increases should be allowed them, then agriculture is entitled to bring to bear arguments and political pressure such as other groups are allowed to use in the interests of improving their position. If the general program should be one under which incomes would have ceilings put over them at about prewar levels, subject to elevation of the ceilings only on a showing that such elevation is essential to development of the maximum war effort, then I believe the great majority of American farmers would willingly accept the sacrifices such a program would place on them.

In considering agricultural price policies, what suppositions shall we make regarding price policies in other sectors of the economy? Under other circumstances, it might be wise either to base discussion in this paper on some more or less arbitrary assumptions as to price policies that will be followed in other fields than agriculture, or to base it on a contention that some particular price policy should be followed in all branches of the national economy. Such a discussion might be quite academic. Present circumstances call for

* This paper was read at the annual meeting of the Western Farm Economic Association held at Stanford University, June 25, 1942.

as practical and realistic a discussion as we can give the subject. It seems most appropriate to start from the existing set of price programs, to assume such further development and modification of these programs in the near future as appear reasonably predictable, and then to pass to a consideration of what ought, in these premises, to be done next. This is what I undertake to do so far as time permits.

It would be desirable to start by summarizing in some detail the main governmental measures taken thus far with regard to prices, and to interpret them in terms of the policies they seem to reflect. There is time, however, to do this only in the broadest way. I hope you will pardon me if I seem dogmatic and if I omit some significant qualifications.

Three Aspects of the Price Problem

Price policies present three quite different faces according to the point from which they are viewed. One prominent aspect of the price problem concerns what may be called the general price level. Popular concern with this aspect has to do mainly with the cost of living. Another aspect of the price problem concerns the distribution of income. Farmers are interested in prices of agricultural products and laborers are interested in wages from the standpoint of their bearing on personal incomes. A third important aspect of prices has to do with the direction of production and the allocation of consumption.

In the consideration of price policies all three of these aspects need to be taken into consideration simultaneously. Various groups in a position to influence policy tend to have their views determined largely by one or another aspect of the problem that particularly concerns them. It is peculiarly the duty and the opportunity of economists to take a balanced view in circumstances which make wise determination of price policies especially vital. The obligation that rests thus on economists needs to be taken the more seriously because it is not an easy one to discharge.

If we economists are to take a balanced view of the problems of price policy in war time, we must lay aside much of our accustomed apparatus of reasoning. It is no good to reason now in terms of economic adjustments as they tend to work out in the long run. We shall not win this war by means of long-run effects. That means that we must lay aside all the customary economic rules that depend for

their validity on long-run effects. We may find it peculiarly painful to put some of our favorite economic dogmas away in moth balls, but we, as economists, are especially fitted to judge what economic dogmas need to be thus laid away.

Recent Governmental Action and Policies

With these considerations in mind, let us look briefly at recent governmental action in the light of the three major aspects of the price problem. In importance, the order of the three aspects is the reverse of that in which I mentioned them earlier.

1. What of prices as a medium for *guiding production, determining the allocation of raw materials, and apportioning consumption?* For industry the decision has already been taken that the utilization of plants capable of producing vital war materials, and the allocation of scarce materials cannot be left to free determination by price and profit incentives. Production of many articles has been sharply restricted or wholly eliminated by governmental order. Production of many other articles has been sharply limited by indirect means, through priority systems applied to raw materials. The allocation of scarce raw materials as between use for war production and other uses is being determined almost wholly by executive order rather than by price. The allocation of scarce materials as between various civilian uses is being increasingly determined by government order rather than by price. Many of the specific actions taken in establishing the new controls are open to valid criticism, but there are few economists who will question the wisdom and necessity of some such general program.

In this process, we have nowhere completely eliminated price and profit incentives. No man or company has been required to manufacture machine guns in place of typewriters. Each has been given the option at least of manufacturing machine guns or being left with little or nothing to do and no plant in which to do it.

As regards the apportionment of consumption, we have not yet gone very far in substituting executive order for prices as the controlling influence, but that is perhaps mainly because, in most lines, supplies left over from more normal times have permitted postponing decision. There is considerable room for argument whether the apportionment of moderately reduced sugar supplies might not better have been left to price incentive rather than handled by rationing. As regards new automobiles, tires, and gasoline on the

eastern seaboard, most will hold that the sharply curtailed supplies may better be distributed on the basis of considerations of equity and need than on the basis of ability to pay fantastic prices. So far as possible, however, we must allow prices, supplemented by education and persuasion, to continue to determine the allocation of consumption. Administrative control of consumption tends to be inequitable and excessively expensive, and to fail to induce the best utilization of the available supplies.

2. *Income considerations* have played a conspicuous rôle in influencing price policies since September 1939. Most of the earlier price controls seem to have been imposed very largely with a view to forestalling emergence of fortuitous profits to industry. Governmental policies with a bearing on wages seem to have looked with favor on increases in the proportion of the national income going to labor. Governmental policy toward agriculture has included legislation aimed directly at raising the incomes of farmers, and legislation that bars the Office of Price Administration from laying controls on agricultural prices until they have risen considerably more than other prices as a group.

Considerations that are essentially economic have had little to do with policy toward prices so far as their income aspects have been concerned. Except for the program of production goals initiated in the office of the Secretary of Agriculture rather than in Congress,[1] none of the prominent governmental policies bearing on prices or wages have been aimed primarily at increasing needed production. None of the income effects have been intended to increase especially those personal incomes that are most readily diverted to the war effort through taxation or bond sales. The income effects have tended rather to decrease the proportion of income easily drawn off through taxes and bond sales. The controlling considerations from the income standpoint have been political. The policies followed have gained support also from more or less widespread opinions that laborers and farmers deserved to have their income position bettered.

During recent months, price policies in relation to incomes have been showing a marked tendency to change. We shall consider these most recent tendencies in another connection.

3. Viewing prices from the standpoint of the *general price level*, there has been nearly unanimous agreement in the United States

[1] See John B. Canning, Foods For Defense, JOURNAL OF FARM ECONOMICS, Volume XXIII, Number 4, November, 1941.

that prices should not be allowed to increase as they did in the last war. On the other hand, there was probably at least a majority opinion in 1939 and 1940 that some general price advance was wholesome. The main influence underlying advocacy and ultimate passage of the Price Control Act was sentiment for restricting advance of the general price level. The facts that enactment of this legislation was so long deferred and that application of such drastic measures as Mr. Baruch had long advocated was even longer deferred, are attributable largely to prevalence of views that some advance in the general price level should be permitted. To some extent, however, these delays are attributable to opposition by representatives of individual groups—notably agriculture—which wanted price increases in certain classes of commodities.

Considerations of general price level probably had relatively little influence on governmental policies with respect to prices prior to the attack on Pearl Harbor. Earlier measures aimed directly at influencing prices seem to have been governed mainly by income considerations. Treasury and Federal Reserve policies, however, were developed with a very definite view to attempting to limit the ultimate price effects of money and credit conditions and of the fiscal measures taken in connection with the defense and the war efforts.

Although in the popular view control of the general price level tends to be regarded primarily as a question of control of the cost of living, we, as economists, know that it has other important aspects. A general price advance tends to favor some economic classes while it injures others. It tends to create maladjustments in the economic system that require corrections not easily made. And it tends to build up forces that magnify the shock of postwar adjustments.

Determinants of Future Policies

The trend of governmental actions having a bearing on prices has shifted strikingly during the past six months. A drastic change has occurred in the official program of direct price controls affecting nonagricultural products. Sentiment in Congress for restricting wage increases and lengthening hours of work before overtime is paid has gained greatly in strength. Passage of such legislation has apparently been prevented or postponed only by agreement of labor leaders to adopt new policies. The Secretary of Agriculture has favored measures tending to restrict price advances of certain agricultural products. Congressional advocates of greater advantages for farm-

ers have been placed on the defensive. Plans are being laid for drastic increases in taxation.

To what extent do these changes, and others that might be listed, reflect merely application of old policies to new situations, and to what extent do they reflect the emergence of new policies? The answer to this question involves prediction. Mere extrapolation of visible trends in governmental action cannot be trusted to give a reliable answer. We must seek guidance from consideration of the forces that are at work to shape policy.

The United States does not have *a* policy with respect to prices. At any given time we have a presidential policy, a congressional policy, and various policies of different administrative branches of the government. These several policies are rarely well integrated and they are often more or less in conflict. Presidential and congressional policies tend to determine which administrative policies shall dominate, and presidential and congressional policies are themselves subject to change under the influence of public opinion. Public opinion in turn, often resistant to argument and persuasion, is highly malleable under the impact of great events, such as are striking day by day.

As regards the direction of productive power of the country, we are already plowing the furrow. A staggering change has been made in the allocation of man-power and equipment. We shall have very soon a shortage of goods for civilian purchase such as few of us can clearly visualize in our imaginations. We shall have a tremendous diversion of income to the government through taxation, through public borrowing, and, if necessary, through credit and currency inflation. The majority of the people of the United States will be forced to a level of consumption, a plane of living, far below that to which they have been accustomed.

All these events may be predicted with certainty. The decisions from which they will flow have been taken; the economic machine has been redesigned to produce these effects; and power is on; we now merely await an outcome which will be affected only in minor degree by decisions and adjustments yet to be made. In certain important respects, however, the outcome remains undecided. It is still to be determined, in large measure, how the scarce supplies of consumers' goods will be distributed, on whom the burden of paying for the war effort will fall most heavily, what people will suffer drastic cuts in living conditions, and who will be the profiteers of this war. The decisions on these questions will not be made

directly, but indirectly. They will be made in connection with the administration of price controls, the administration of priorities and rationing, the passage of tax legislation, the decision on imposing compulsory saving, the enactment of legislation affecting agriculture, and the administration of existing laws and the enactment of new laws affecting labor.

I shall not venture to try to predict in detail the outcome of these decisions yet to be taken, but there are certain predictions which I think can be made with confidence. Many people in distributive trades and in some lines of industry will suffer serious curtailment of income. Price ceilings will have to be raised at many points, with the result that costs of living will rise further. A majority of the people, burdened by greatly increased taxes, possibly by enforced savings, and by increased prices, while their incomes have increased little or have declined, will become bitterly critical of those groups of the population whom they see living in unaccustomed prosperity. In short, there will be increased emphasis on restraining price advances, and there will be an entirely new attitude on the subject of personal incomes and on sharing of the burden of federal taxation.

Income Comparisons

These coming developments will have profound effects on labor and on agriculture. Agriculture will be more directly affected than labor by the public resentment of price increases. Both labor and agriculture will find their income position under scrutiny. Let us attempt some pertinent income comparisons.

The data available for following from month to month and from year to year the changes in economic position of different groups in the population are very unsatisfactory. One of the things urgently needed for the war effort is a set of adequate indicators of such changes in considerable detail. They would be the gauges on the boilers of the war engine. Today we can only guess in which boilers, if any, the steam pressure has been run up to the danger point and in which boilers there is no pressure at all. The accompanying tables give some of the best available information bearing on the subject. The tables show only annual data, but all the series except two are now published monthly[2] and may be kept up to date.

[2] Publication of the income series for government and for service industries has been discontinued. Whether the enemy is thus deprived of much valuable information is questionable. Our own loss from discontinuation of these series is substantial.

In Table 1, income payments during the calendar year 1941 are compared with corresponding payments in 1929 and with averages for the ten years, 1930–39. Most of the data in the next two tables are available only from 1932. To permit comparisons on a common basis in all three tables, Table 1 includes also comparisons of income payments in 1941 with corresponding payments in the eight years, 1932–39. The principal comparisons made on this basis are shown graphically in the accompanying charts.

TABLE 1. CHANGES IN COMPONENTS OF THE NATIONAL INCOME, IN TERMS OF INCOME PAYMENTS, 1929 TO 1941*

(*Billion dollars; per cent*)

Series	1929	Average		1940	1941	Index for 1941		
		1930–39	1932–39			1929 =100	930–39 =100	1932–39 =100
A. *Classification by type of payment:*								
Entrepreneurial income[a]	17.33	12.05	11.84	14.38	17.06	98	142	144
Dividends and interest	11.84	8.98	8.48	9.08	9.63	81	107	114
Wages and salaries:								
Commodity-producing industries[b]	21.70	13.92	13.35	18.85	26.26	121	189	197
Government	4.91	5.16	5.20	6.63	8.32	170	161	160
Distributive industries	13.68	10.02	9.57	11.64	12.95	95	129	135
Service industries	11.91	9.13	8.79	10.55	11.17	94	122	127
Work-relief wages	.00	1.13	1.41	1.58	1.22	[c]	107	86
Direct and other relief	.06	.67	.80	1.10	1.11	[c]	167	139
Social security benefits and other labor income	.94	1.43	1.41	1.89	1.81	194	127	128
B. *Classification by source:*								
Agricultural	8.06	5.30	5.37	6.62	8.64	107	163	161
Non-agricultural	74.31	57.19	55.48	69.09	80.90	109	142	146

* Estimates of the U. S. Dept. Comm., from *Survey of Current Business*.

[a] On the average, about one-third of entrepreneurial income (including net rents and royalties) has been derived from agriculture. (*Monthly Income Payments in the United States, 1929–40*, U.S. Dept. Comm., 1940, p. 39.)

[b] Including wages and salaries in agriculture.

[c] Not calculated.

Let us notice first the relationships between income payments in 1941 and in 1929 (Table 1). Of the principal classes of income according to type of income payment, only two show totals in 1941 which were higher than in 1929: wages and salaries in commodity-producing industries, affected by a great expansion under the defense effort, were 21 per cent higher in 1941 than in 1929; wages and salaries paid by governments, affected by the great expansion in governmental activities since 1929 and by the recent expansion of the military services, were 70 per cent higher in 1941 than in 1929. On the other hand, wages and salaries in distributive industries were 5 per cent lower in 1941 than in 1929; and dividend and interest payments were 19 per cent lower in 1941 than in 1929. Agricul-

tural net income, despite a great contraction in export demand for agricultural products, was 7 per cent higher in 1941 than in 1929.

A more striking showing of relative gain in the income position of agriculture is given by comparing incomes in 1941 with averages for either the ten years 1930–39 or the eight years 1932–39. On either of

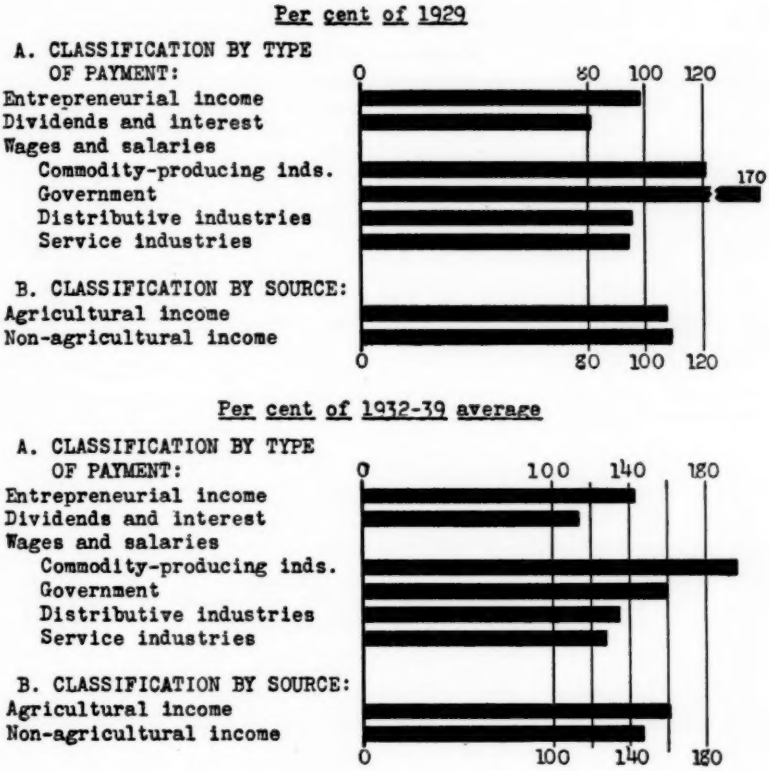

CHART 1. AGGREGATE NATIONAL INCOME PAYMENTS IN 1941 AS PERCENTAGES OF EARLIER AVERAGES
(Data from Table 1)

these comparisons, agricultural income has increased more even than wages and salaries paid by governments, despite the great expansion of the armed services in 1940 and 1941.

Different types of agriculture and different regions have fared somewhat differently, as is indicated by the data in Table 2. These data on total cash income from farm marketings plus government

payments, it should be noted, represent gross income rather than net income. For the United States as a whole cash income from these sources in 1941 was 66 per cent above the average for 1932–39. Allowing for non-cash income and for production expenses, the Department of Commerce calculates that the increase in agricul-

TABLE 2. CHANGES IN CASH INCOME FROM FARM MARKETINGS PLUS GOVERNMENT PAYMENTS, 1932–39 TO 1941*

(*Million dollars; per cent*)

Region	1932–39	1940	1941	Index for 1941 1932–39=100
United States	7,082	9,097	11,771	166
West North Central region	1,671	2,294	2,992	179
East North Central region	1,326	1,777	2,311	174
South Central region	1,330	1,632	2,247	169
Western region	1,143	1,519	1,978	173
North Atlantic region	753	997	1,169	155
South Atlantic region	732	879	1,075	147

* Estimates of the U. S. Dept. of Agr., from *Farm Income Situation*, February issues, and (prior to 1937) *Receipts from the Sale of Principal Farm Products and Government Payments by States.*

TABLE 3. CHANGES IN INDUSTRIAL WAGES, 1932–39 TO 1941*

(*Dollars; per cent*)

Industry	Weekly earnings				Hourly earnings			
	1932–39	1940	1941	Index for 1941 1932–39 =100	1932–39	1940	1941	Index for 1941 1932–39 =100
Average, 90 industries	21.23	26.05	30.96	146	.562	.670	.736	131
Blast furnaces, steel mills	23.26	31.42	37.66	162	.690	.847	.943	137
Foundry and machine shop	23.02	30.02	36.52	159	.622	.733	.809	130
Structural and ornamental metal	22.60	28.74	34.89	154	.613	.736	.812	132
Brick, tile, and terra cotta	16.73	20.82	24.23	145	.460	.562	.632	137
Glass	21.56	26.58	29.68	138	.602	.745	.794	132
Lumber, saw mills	16.63	19.03	21.48	129	.441	.501	.550	125
Petroleum refining	30.27	34.97	37.95	125	.821	.975	1.032	126
Slaughtering and meat packing	24.19	27.59	29.25	121	.577	.686	.738	128

* Data of the U. S. Dept. of Labor, from *Survey of Current Business* and *Statistical Abstract of the United States.*

tural net income over this period was only 61 per cent. For different regions, the Department of Agriculture calculates that the increases in cash income between 1932–39 and 1941 ranged from 47 per cent increase in the South Atlantic states to 79 per cent increase in the West North Central states.

If we undertake to compare changes in agricultural income with

changes in earnings of industrial workers over recent years, we encounter questions on which there is room for difference of opinion. During these years prices and wages have risen, many unemployed workers have been re-employed, and many workers in industry have increased the number of hours worked. What shall be taken as the base representing no change in earnings of industrial workers? Shall we say that zero change is represented by no change in the weekly wage bill of industry, and therefore that zero change is represented by a decrease in weekly earnings per man offsetting the increase in number of men employed? Shall we say,

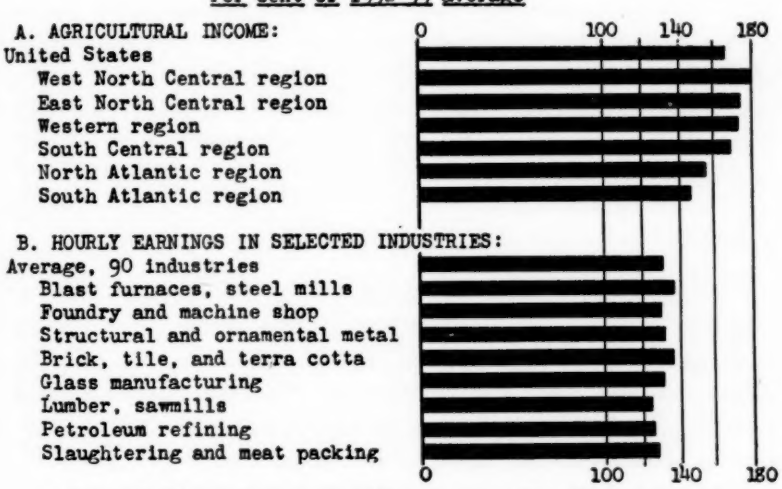

CHART 2. MONEY INCOME FROM MARKETING OF FARM PRODUCTS AND FROM GOVERNMENT PAYMENTS, AND HOURLY EARNINGS IN INDUSTRY, 1941 AS PERCENTAGE OF 1932–39 AVERAGE
(Data from Tables 2 and 3)

rather, that zero change is represented by no change in weekly earnings per employed worker, and therefore that zero change is represented by a decrease in hourly earnings per man offsetting the increase in number of hours worked? Or shall we say that zero change is represented by no change in earnings per hour worked? Table 3 gives comparisons of industrial wages on both of the latter two bases, namely, in terms of earnings per week and in terms of earnings per hour worked.

The data on agricultural income are not available on a basis of earnings per man per week or per hour worked. It seems safe to as-

sume that the number of man-hours devoted to agricultural work in the United States was not much different in 1941 from the average during 1932–39. It is more likely to have decreased than to have increased. If so, it is at least fair to agriculture to compare changes in hourly earnings in industry with changes in total agricultural income. On such a comparison, agriculture shows an increase of 61 per cent between 1932–39 and 1941 and 90 industries show an average increase of 31 per cent. In terms of weekly earnings, the corresponding figures are 61 per cent for agriculture and 46 per cent for industrial workers.

Thus far relatively few people in the United States have felt more than the beginning of pressure from the huge tax bill to which we have committed ourselves. In the next few months, the burden of federal taxes must press heavier and heavier on our shoulders. Income comparisons will deserve to be put on a basis of income remaining after payment of direct and indirect federal taxes. Because much agricultural income is in the form of home-produced goods, agriculture will tend to bear less than its share of income taxes and less than its share of sales taxes on consumption goods.

Fundamentals for Agricultural Policy

In the foregoing presentation of data, I have not included some comparisons which may be drawn to indicate that agricultural incomes were still quite low even in 1941. This is no time for those who have the interests of farmers at heart and who would try to offer wise counsel to fix their eyes on special arguments. For some years representatives of agriculture have been calling on the public to look at the farmer's problem from the farmer's point of view. Farmers have thereby gained much sympathy and much financial advantage. A time has come when the framing of wise agricultural policies requires that farmers look at their position from the point of view of the public, and with an eye on the grave problems of the nation.

A year ago this month Vice President Henry A. Wallace gave a noteworthy speech to the Agricultural Adjustment Administration Annual Conference. It was presented as an informal talk, but it was one of Mr. Wallace's great addresses. He was speaking shortly after Congress had passed legislation requiring that loan rates on agricultural commodities be raised to 85 per cent of parity, and in the midst of a new campaign for still stronger measures for raising agricultural prices. Mr. Wallace took as his first theme two sen-

tences drawn from a report which was to be proposed for adoption by the Conference. These sentences were:

> The defense effort must succeed, the interests of any economic group must be subservient to it. Our national point of view must be animated and inspired by a willingness to give rather than a desire to take.

The Vice President then asked his audience to consider possible consequences for agriculture at the end of the war. Two paragraphs from his analysis merit quotation here:

> I can see some terrible trouble ahead for farmers if the props are knocked out from under the Commodity Credit Corporation, if the Ever-Normal Granary system is destroyed, if the Stamp Plan system is destroyed, if the Surplus Removal system is destroyed. And there will be millions of people pushing to destroy these systems when the war comes to an end.
>
> We must recognize that frame of mind. We must not over-play our hand. I think it would have been a serious mistake to have had a 100 per cent of parity loan provided. I think that would have been inviting destruction of the whole farm program later on, and a debacle worse than those of 1921 and 1932. I am not talking about justice, I am talking about the way forces will work. And I will say frankly for my part I have a grave question as to whether the 85 per cent instead of a 75 per cent may not turn up later on to plague you.

What Mr. Wallace spoke of as a defense effort has become a war effort that requires all our powers of production, that will demand increasing sacrifices, and that will leave the nation with a staggering burden of debt and immense problems of economic readjustment. Wise agricultural policies in these circumstances will be founded on three principles: (1) whole-hearted cooperation by agriculture in the best production program that can be devised; (2) elimination of political pressure for immediate economic gains for agriculture; and (3) acceptance of some hardship and sacrifice.

Let us look briefly at the significance of each of these principles. Application of the first principle is more a problem for government than for farmers. Farmers may be counted on to bend their efforts toward the highest production possible in the circumstances which they are given to work under. The problem is to provide wise guidance for the individual farmer. Never before, probably, has any government had an organization so well equipped with economic and technical knowledge for planning and directing a wise program of agricultural production in time of war as our government has now in its Department of Agriculture. Let us put the problem of agricultural production in the hands of the Department of Agriculture with full powers and full responsibility.

The elimination of political pressure for immediate economic gains for agriculture requires a sharp reversal of tendencies established through many years. Agriculture has rightly developed a political organization to press for improvement of its position. For many years gains were hard to make, but in 1940 the tide turned, and since then great economic gains have been achieved. It is hard for an organization built to gain advantages for agrciulture to check its efforts just at the time when gains are most readily won. But now, with demands for food and for most of the industrial materials derived from agriculture at a high peak, agriculture does not need special assistance to win a fair income for farmers. The main valid general ground for governmental assistance for agriculture rests on the tendency for incomes of farmers to fluctuate with excessive violence. If agriculture is to hold public support for its claim to the right of governmental aid in filling up its income troughs, it must demonstrate now its willingness to relinquish such aid when its income nears a peak.

There are some hardships and some sacrifices also that must be accepted by certain branches of agriculture. Having regard to the limits on man power and on materials, a wise production program for agriculture must include curtailment of production in some lines. In industry and in commerce men and machines are being shifted from one occupation to another partly by inducement of good incomes in the needed lines of production and partly by the hard pressure of curtailed or even vanishing incomes in other lines. Farmers also must accept the pressure of reduced incomes for those who cannot or who will not make needed shifts. Farmers must be willing also to allow possible advances in their incomes to be checked by price restrictions and by restraints on the consumption of particular farm products. If they would have the public continue to accept the principle that the troughs of agricultural income should be raised, the farmers themselves must accept the corollary principle that some of the peaks of agricultural income should be depressed.

All that I have had to say may perhaps be condensed into the statement that agricultural policies in time of war should be guided by two dominating considerations: a broad view of what is best for the interests of agriculture in the long run, and a high determination to serve the nation through production, through self-restraint, and even through sacrifice.

NEW FRONTIERS OF THE GREAT PLAINS*

A Cultural Approach to the Study of Man-Land Problems

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HUMAN suffering in the Great Plains Region of America in recent years is a matter of common knowledge. Migration out of the Region, high cost of relief, absentee land ownership, excessive farm indebtedness and mortgage foreclosure, extensive tax delinquency, continued feed and seed loans, and current poverty are indicative of the complexity as well as the prevalence of the problems in the Great Plains. Extensive migration out of this Region prior to the present war, to the Pacific Coast States, did not solve the problems for the Region, but resulted in further tax delinquency, greater sparsity of population in relation to adequate economic and social services, a disturbed tax base, and other maladjustments. Furthermore, such migration out of the region into other farming areas and urban centers prior to the war contributed to an increased number of stranded people in these more favored areas.

The recent war effort has temporarily modified this last situation, but is creating other potential sources of maladjustment. The prospective agricultural labor shortage and the lack of industries in the region mean that the population, as a whole, will feel the economic shock of the war more drastically than in some other regions. The heavy exodus of farm and non-farm population to industrial areas outside the region foreshadows a greater need for reabsorbing some of the returning man-power into the agricultural economy of the region after the war than in some other regions.

It is not probable that any large part of the Great Plains will become public domain as a result of pre-war and post-war conditions. Some people will always live on the Great Plains. On the assumption that these people should be as nearly self-supporting as

* Paper No. 164, Journal Series, Agr. Exp. Sta., Montana State College. Portions of this paper were read at the Pullman, Washington, meeting of the Western Farm Economics Association, July 10, 11, and 12, 1940. It has since been revised and is presented for publication at this time because the present War efforts are likely to halt or change materially any recent progress made in the direction of developing a culture for the Great Plains Region. A pertinent question now is the following: "How can the present war effort be used to help maintain and further develop the beginnings of an adapted culture for the Great Plains Region, and how can this approach be kept alive so as to assist in the post-war reconstruction?"

possible, no matter what their number, what is a likely approach to the improvement of conditions in the Great Plains?

The thesis of this paper is as follows: The Great Plains has a physical environment very different from that of the humid regions to the east and along the Pacific coast. The major characteristics of the culture that was originally carried into the Great Plains Region were developed in humid regions of the nation and were not adequately adapted to the peculiar physical conditions of the Great Plains. This lack of adaptation between physical environment and culture is the source of many complex problems recently extant on the Plains. These problems, created by man, are subject to control or adjustment by man. But it will require adjustment of the culture to the peculiarities of the physical environment.

A further implicit thesis of this paper is that the cultural approach to the study of man-land problems is a method of getting at economic and social difficulties in any area. Since present war activities are likely to disrupt recent attempts at developing an adapted culture for the Great Plains, there is a possibility that intelligent post-war reconstruction may have to await the redevelopment of this idea. It is important, therefore, to keep this point of view alive during the war period.

The Great Plains Region

A region is a large space having similarity of geography and physical environment. The transition from one physical region to another is usually not abrupt and clearcut but gradual, and the boundary itself may represent an area rather than a narrow line.[1]

The Great Plains:—The Great Plains, as the term is here used, includes the area west of the 100th Meridian line, from Canada into Texas, and westward to the foothills of the Rockies. The 100th Meridian line passes near Jamestown, North Dakota and is in the vicinity of the 20-inch annual rainfall line. West of this line, the rainfall averages less than 20 inches.[2]

This represents an area nearly 1,000 miles in length and from 225 to 700 miles in width. It includes roughly 266 million acres of territory, 14 per cent of the total area of the United States. Nearly two and three-fourths million people live within the region, or about

[1] For a definition of region see the National Resources Board Report for Dec., 1935, Ch. 12; and the Encyclopedia of Social Sciences, Vol. 7, revised edition, 1937.

[2] This eastern boundary is to the west of that established by the President's Committee in its report, "The Future of the Great Plains," U. S. Printing Office, December, 1936.

two and one-fourth per cent of the United States total.[3] Parts of ten states, covering 259 counties, lie within its border.

There may be some question concerning the boundaries of the area. By changing a few of the physical environment criteria used to determine the Great Plains Region, it would have been possible to include portions of the Rockies and some of the area west of the Rockies. The actual delimitation of the region is partially governed by the purpose to be accomplished. The present definition is, however, sufficient for the purpose of this paper.

Regionalism:—Regionalism is here used to include a body of organized, integrated and unified facts, ideas and beliefs related to the cultural, political, administrative, economic, and social characteristics of an area having similarity in physical environment. Regionalism should not be confused with sectionalism. Sectionalism implies self-sufficiency, independence, and separation in a political sense, from a larger area of influence or domination. Regionalism, on the other hand, means that the particular region is a part of a larger area, is dependent upon the larger area, but also has peculiarities that require adjustment within the region.[4] In this sense, a region recognizes that it is dependent upon a larger area of influence in order to achieve its fullest development, but the larger area of influence recognizes that, for the fullest development of the region and the larger area, consistent adaptations to local conditions are necessary and desirable. Cooperation rather than conflict, toleration rather than domination and subjugation are typical of the relations between the region and the larger area.

Culture:—Culture has reference to all man-made objects, philosophies, ways of thinking and acting, social organization, traditions, tools, and impliments as well as ethical and moral valuations in a given area. It is the social environment that has been handed down from the past, that operates in the present, and shapes the future.[5]

Theories of determinism or monistic causation are giving place to the functional approach, among scientists in the study of the relation of culture to the physical environment.[6] There are, however, still strong evidences of thought patterns that can be labelled geo-

[3] According to the 1930 census.

[4] For a detailed discussion of Regionalism in this sense see Howard Odum, "Southern Regions," Univ. of North Carolina Press, 1935; also Howard Odum and H. E. Moore, "American Regionalism," Henry Holt, 1938.

[5] See Jerome Davis and H. E. Barnes,"Introduction to Sociology," Heath & Co., revised edition, 1931, Book II, Part IV; Encyclopedia of the Social Sciences, Vol. 4.

[6] See the discussion of Determinism, Geography, Environment and Fatalism in the Encyclopedia of the Social Sciences, Volumes 5 and 6.

graphic, cultural, psychological and social determinism, found among scientists, other people and other social forces.[7] The functional approach must be supplemented by, and in fact is hypothecated on, the explanation of causal origin; but the effort to seek a cause is limited by methodological devices. This is done by establishing a variable and then seeking to test the degree of influence exerted upon it by other dependent variables.

An intelligent approach concerning the relationship of culture to physical environment assumes that both set potential limits beyond which the other cannot operate. The problem for study is to determine which, at the time, is the independent and which the dependent force, the extent of the leeway one allows the other, and the degree of intensity of this relationship. Special problems apparently arise when areas having striking contrasts in physical environment are bound together within the confines of the same culture area.

The Great Plains Physical Environment

The Great plains physical environment is characterized by extreme variability and fluctuations and is semi-arid in character. It is variable in temperature, both as to rapidity and degree. It has extremes in wind velocity, topography and relief, soil types, and other natural phenomena.[8]

Climatical Variations:—Temperature variations are extreme in the Great Plains, within seasons as well as between seasons. The blizzard at 40 below zero, the mid-winter chinook, and the drought-creating, dust-blowing heat waves are typical. The ranges of the frost-free periods vary considerably from year to year, and the variations in daily temperature are extreme.

Precipitation Variations:—The form of precipitation shows great variations, ranging from "killing" blizzards to light and gentle snow; from heavy down-pours of cloudburst nature, frequently accompanied by heavy hail, to a gentle and light falling three-day rain; from morning dew to morning heat. The average precipitation is 20 inches or less which is near the margin for economical crop production. Hence, any deviation from this average in terms of amount and time of rainfall results in crop failures or bountiful

[7] By other social forces is here meant the ideas and beliefs associated with institutions, groups, social organizations and social processes, whether these are conscious or unconscious ideas or beliefs.

[8] See Atlas of American Agriculture, U. S. Printing Office, 1936; and the 1941 Year Book of Agriculture, entitled "Climate and Man," pp. 177 ff.

yields. The usual droughts and the sparsity of rainfall make possible an accumulation of plant nutrients in the soil, not lost by leaching, so that more than the average amount of rainfall will result in heavy yields.

A comparison between eastern Montana and Iowa is interesting at this point. During a period of 37 years, the average annual precipitation for Iowa was 31 inches compared with slightly more than 15 for eastern Montana.[9] In only one year (1910) did precipitation in Iowa drop as low as 20 inches. Although precipitation varied in Iowa, it never was as low as the average for eastern Montana. At Havre, Montana, only two in a series of 42 years between 1895 and 1936 had more than 20 inches of rainfall. Eight years had fewer than ten inches of precipitation. At Bismarck, North Dakota, only 3 out of 42 years had more than 20 inches of rainfall annually.

Usual Precipitation:—A not unusual opinion of many farm and livestock people who migrated into the Great Plains during favorable years of precipitation was that a usual supply of rainfall was something more than an average of 20 inches annually. In the past ten years, many Great Plains' farmers have been looking forward to "usual rainfall." But in the Great Plains the usual rainfall is considerably below 20 inches. In fact, "usual" rainfall on the Great Plains is represented by one or a series of dry years followed by one or a series of wet years. Semi-arid climate on the Plains does not mean a uniformly small amount of rainfall, but uniformity in irregular amounts of rainfall. Nor is this irregularity cyclical in nature. There appears to be nothing predictable about the amount of rainfall.

A study of tree ring growths in the vicinity of Havre, Montana, shows that rainfall may have varied from one-fourth of average to more than double the average.[10] This study goes back to 1784, and the data show that there have been wet and dry periods of from 5 to 10 years in length, succeeding one another. Apparently a severe drought period occurred after 1784 when 20 out of 24 years had less than average precipitation. These same data show that 17 out of 21 years prior to 1938 apparently had less than average precipitation. Again, during the last 154 years there have

[9] Information taken from the U. S. Weather Bureau Reports on Climatological Data.

[10] These data were compiled by A. E. Bell, formerly Superintendent of the Northern Montana Branch Experiment Station located at Havre, Montana. The data are unpublished.

been seven periods, varying from 4 to 9 consecutive years each, during which precipitation was likely not below the average. There were also eight periods, varying from 3 to 11 consecutive years each during which precipitation was probably below the average.

Soil Type Variations:—The above differences in temperature and rainfall have, during a long geological period, made for a wide variety of soils. The movements of glaciers, the formation of bodies of water when the ice receded, and erosion have produced all types of soils, topography and relief on the terrain. Scattered badlands, isolated mountains, clay hills and buttes, fertile river bottoms, table-flat benches, smooth plains and rolling hill country are all indicative of variations in soil type and topography.

Native Plant Life:—The native plant life is evidence of the difference in physical environment between the Great Plains area and the more humid regions to the east and far west. The Great Plains is a treeless, short grass country. Grama, buffalo grass, sage brush, gallata, wire grass, mulenbergia, western wheat grass, and needle grass are evidence that nature, over a long period of time, developed plant life that was adapted to the vagaries of the Great Plains physical environment.[11]

Native Animal Life:—The native animal life on the Great Plains is characterized by ability to move great distances rapidly and do without water for long periods of time.[12] This is a form of adaptation to the physical environment.

The Adapted Indian Culture[13]

The American Plains Indian had learned to adjust himself to the physical environment in which he lived. The buffalo formed the core of his culture. It served him with food; skin for tents, clothing, blankets, and footwear; was the center of his occupational, religious, and recreational life; and supplied him with fuel and bones for tool making. Since the buffalo was a migratory animal the Indian also was a migrant. The Indian's tent, his social organization, customs, and traditions were adapted to the need for migration, and he was thus able to live on the Great Plains.

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[11] See the Atlas of American Agriculture, U. S. Printing Office, 1936.

[12] See W. P. Webb, "The Great Plains," Ginn and Co., 1931, pp. 33 ff. There is also a later trade edition which is not a revision.

[13] See W. P. Webb, op. cit., chap. 3; Clark Wissler, "The American Indian," Oxford Univ. Press, second edition, 1922; Clark Wissler, "North American Indians of the Plains," Lancaster Press, Third Edition, second printing, 1934.

The Coming of the White Man

After 1800, the Great Plains was invaded from the east and the south. First came the era of expeditions, among them those led by Lewis and Clark (1803–06), Pike (1806–07), and Long (1819–20). The region became known as "The Great American Desert" from the descriptions furnished by these and later explorers.

The American Trails:—Next came the period of the Great American Trails (1821–1869). They led from east to west, usually following water courses.[14] Examples are the Sante Fe Trail, the Oregon Trail, the Mormon Trail, the Bozeman Trail and others. These trails were the means of jumping a vast desert to get from one wooded, well-watered territory to a nother. Whenever the trails cut across country from one river course to another, the travelers were confronted with lack of food, water, and fuel. Many present day highways and railroads still mark the courses of these trails.

The Cattle-man's Culture:—A study of the cattle-man's way of living shows that his culture developed in Texas immediately after the Civil War, where it was influenced by the ways and customs of the Spaniards. Since the North offered markets, and the Northern Great Plains were good grazing land, there followed a period of trailing cattle from the South. The period of the cattle trails (1866–1885) resulted in the first attempt of the whiteman to live in the Great Plains. Ranches were soon established north of Texas, some as summer headquarters, others as supply depots for travelers going West and some as permanent homes in the grasslands.

The early cattle-man's culture, including for example such traits as the "trail herd," the branding and roundup system, the regulations governing trailing, the use of land, and the handling of strays, was adapted to the physical environment of the Plains.[15] The ranch headquarters were usually situated along water courses and the cattle ranged for hundreds of miles in any direction, resulting in a peculiar system of land control. Often the ranch headquarters were in the mountains and the cattle were trailed into the plains country.

[14] See R. L. Duffus, "Sante Fe Trail," Longman, Green & Co., 1931; Wm. J. Ghent, "The Road to Oregon," Tudor Publishing Co., 1934; F. Parkman, "The Oregon Trail," C. Scribner's Sons, 1924; E. N. Dick, "Vanguards of the Frontier," Appleton Century Co., 1941, chap. 7 to 17; G. R. Hebard and E. A. Brininstool, "The Bozeman Trail," A. H. Clark Co., 1922, two volumes.

[15] See E. S. Osgood, "The Days of the Cattleman," Univ. of Minn. Press, 1929. W. P. Webb, op. cit., chap. 6; E. N. Dick, op. cit., chap. 20 to 22; P. A. Rollins, "The Cowboy," Charles Scribner's Sons, 1936, Third revised edition.

Again mobility made it possible for the cattle-man's culture to exist in the plains. Not until Eastern and European capital came into the Great Plains after 1870, did the overstocking of the range bring difficulties. Until that time the old cattle-man's culture was peculiarly adapted to the Great Plains physical environment.

The Pioneer Woodsman Confronted by the Plains:—Next came the agriculturists who moved in from the east. The farming frontier, in its western advance, had reached the Missouri River at the western edge of Northern Missouri by about 1850. During the next two decades, the frontier advanced "only two days' ride on horseback from the Iowa and Missouri boundaries." The reason for the hesitation in population advance came largely from the fact that the pioneer woodcutter and farmer was faced with a treeless, waterless expanse. The forest-country pioneer agriculturalist was a woodsman who lived by hunting and from products raised in a small clearing. He built his home and barns as well as fences out of the timber from his clearing. Frequently he settled along some stream. This furnished him with some food and was also a means of travel. All at once this pioneer was faced by a great expanse that was already cleared by nature. Grass was plentiful, but game was scarcer than in the forest country. Building and fencing materials were lacking. So were fuel and water.

New Inventions to Conquer the Plains:—To advance onto the Plains it was necessary to await certain inventions. Webb gives a dramatic picture of a few of these. According to Webb, the Colt revolver came into wide use at this time. The early pioneers were hunters with "long guns," forest weapons. On horseback or afoot these "long guns" were cumbersome and ineffective against the game and especially the Indians. The Colt revolver, a short handy gun, helped to turn the balance in favor of the Whites.[16]

It took the American Pioneer of log-cabin background a long time to learn to construct and live in a sod-house, the dug-out or the tar paper shack. The adjustment for the pioneer women who came west to meet their "lovers," only to find they had to live in such strange living quarters, required a tremendous shift in values, ways of thinking, and ways of living.[17]

Next came the problem of how to confine the domestic stock.

[16] W. P. Webb, op. cit., pp. 167 ff.

[17] E. N. Dick, "The Sod-house Frontier," Appleton-Century, 1937, chap, 8, 16, 17, and 18; H. Ruede, "Sod-house Days; Letters from a Kansas Homesteader," edited by John Ise, Columbia, 1937.

There are still remnants of nurseries in Illinois, Iowa, and Missouri where hedges and prickley bushes were grown, to be shipped west for fencing. Extensive settlement in the Plains had to await the invention of the barbed wire fence. The development of this invention offers an interesting page in the history of the need for adaption to the Great Plains physical environment.[18]

The development of the windmill to furnish water for house and stock is another illustration of an invention necessitated by the forces of the physical environment. The battle over irrigation rights and water use, a struggle between miners and farmers, represents another point at which adjustment to the physical environment had to be accomplished in order to utilize the fertile farm lands of the West.[19]

The Need for Additional New Inventions to Live on the Plains

This, however, is the point at which Webb stopped his analysis. Were there no other inventions that had to be accomplished before the real battle of man against environment was accomplished in the Great Plains? Did the environment become more favorable so that culture traits, imported from humid areas, could survive without undergoing any further tests? Have the last 10 to 15 years represented a period when the Great Plains physical environment has more nearly approached its normal so that the ideas carried into the Great Plains since the revolver, the sod-house and the barbed-wire fence are being subjected to a test of natural selection?

This represents a field of difficult and unexplored research, and is the problem upon which the second half of this paper centers. Just how well is the culture—the ways of living and thinking, the tools and equipment, the prevailing philosophy and customs—adapted to the demands of the Great Plains physical environment? What is the relation between culture and physical environment? How long and under what conditions can culture develop independent of physical environment, and when do the two supplement one another? Have we arrived at a point of conflict between culture and physical environment? Is the total culture ill adapted to the physical environment or only parts of it and what are these parts? How can the culture for an area be adapted to the demands of the

[18] W. P. Webb, op. cit., pp. 280 ff.

[19] W. P. Webb, op. cit., pp. 333 ff. There is much literature dealing with the problems of water use, ownership and rights and the origin of such rights.

physical environment and still function effectively within the scope of a larger culture?

There is evidence to show that culture and physical environment operate conjointly in their influence on civilization. In the Great Plains this relationship between culture and physical environment is probably much more sensitive than in the case of the humid areas of the nation. The cost of relief, feed and seed loans, and human suffering in terms of excessive debt, tax delinquency, foreclosure and non-resident land ownership are evidence of maladjustment between the existing culture and the physical environment. It is doubtful whether feed and seed loans, relief, rehabilitation, and higher incomes to Great Plains people are more than an economic and political stop-gap and temporary expedient unless these efforts are directed at bringing about fundamental changes in culture at certain points, so as to bring culture in alignment with the limits imposed by the physical environment. In a nation as large as the United States, with as great variations in physical environment as exist, cultural differences must be expected and encouraged. This will require that the nation as well as the region become cognizant of the need for differences in culture and adjustment of culture to physical environment. Channels for the development and maintenance of these cultural differences must be established and fostered. This means that regionalism, in the aforementioned sense rather than sectionalism or paternalism, must be the basis for recognizing and dealing with cultural variations within a large political domain or a nation.

Unadapted Culture Traits on the Plains

It now becomes necessary to offer some evidence in support of this position. Obviously conclusive proof is not available. Considerable research is still necessary. Nor is this research alone within the confines of the subject matter of sociology, economics, geography, or anthropology. It requires the coordinated effort of all these and other scientists.

A study of geography, economics, sociology, history, and other subject matter shows that there is a relationship between culture and physical environment on the following four points: (1) population density, (2) degree of urbanization, (3) occupational specialization, and (4) division of labor. Under the last would come specialization of economic, social, political, educational, and religious functions.

In diagram A we can assume two widely different types of physical environment. For convenience one has been designated as a humid, the other as an arid environment. Theoretically, it is apparent that wide variations may exist in respect to the four factors mentioned between the arid and humid regions. The arid environment would tend toward a sparse population, with little, if any, urbanization. Most people would be engaged in agriculture or closely related occupations, and the division of labor would not be great. The family would tend to approximate the patriarchial

DIAGRAM A: COMPARISON OF CULTURAL CHARACTERISTICS IN ARID AND HUMID REGIONS

Cultural Characteristics	Arid Region	Humid Region
(1) Population density	Low and sparse	Low and sparse, high and dense, or both.
(2) Degree of urbanization	Low and rural	Low and rural, high and urban, or both.
(3) Occupational specialization	Low and agricultural	Low and agricultural, high and industrial, or both.
(4) Division of Labor	Low and family centered	Low and family centered, high and contractual or special interest group centered, or both.

type, having political, religious, recreational, and educational functions to perform.

In the case of the humid area, these characteristics may vary all the way from what they are in the arid region to a more complex situation. Conceivably, the population might be very dense, much of it concentrated in urban areas, and engaged in both agricultural and industrial pursuits. The division of labor can conceivably be very high and on a contractual and special interest group basis. This may mean a relative weakening of the family and a specialization as to function in that special interest groups may develop to sponsor the political, recreational, religious, educational, and other functions in the community.

It is conceivable that the agricultural areas and populations in such humid areas can also become urbanized to the extent of taking on most of the industrial and urban parts of the total culture.

In a cultural area, government or political state where there are two or more distinct types of physical environments such as the arid and humid, and where the humid environment is dominated by a highly urbanized, industrialized and commercialized culture, it is possible that the arid region will be dominated by these same

urbanized, industrial, and commercial aspects. This is especially true if there is a high development of transportation and communication facilities and when these are so constructed as to feed all types of culture traits from the humid (urban, industrial) to the arid regions. Under these conditions, it would be highly probable that the culture established in the arid region would be out of line and in a position of conflict with the physical environment in the arid region.

Is there any evidence that the culture traits[20] of the humid areas to the east of the Great Plains have been imported into the semi-arid Great Plains without being adapted to the physical environment in the Great Plains? It is possible to enumerate only a few of these.

Settlement Pattern:—In Eastern Montana there is evidence to show that the agriculturalists attempted to settle on the same basis as in Iowa, Minnesota, Wisconsin, or the Middle West generally. There are large areas, now mostly abandoned, where there is an expensively graded county road on almost every section line, with a fence on each side of the road. Expensive culverts and bridges still are monuments to a midwestern way of living.

Organization of Township Government:—In Western North Dakota, the township government, frequently consisting of a township of six square miles, is still in existence. In Montana the county is the smallest political unit, other than the incorporated village. But in eastern Montana the school district frequently takes the form of a congressional township or some multiple of it. Apparently the idea of six square miles, or some multiple of it, as the basis for defining public service areas was hard to overcome. Consequently school districts are frequently too small in the eastern part of Montana when measured in terms of an adequate and equitable tax base and service area.

Dry Land Settlement and Farming Carried into Irrigated Areas:—There are places in Montana where the size of farm, because of the homestead policy, is as large in an irrigated as in an unirrigated

[20] The total culture can be broken down into component parts that are unified wholes in themselves. These component parts are known as patterns, complexes and traits, depending upon their inter-relationships. These are only relative terms and tools of analysis. For example, our pattern of transportation is made up of the following complexes: air, water and land transportation. Each of these is made up of traits. Thus, land transportation is made up of railway, motor driven, horse, and foot travel. Each one of these is made up of separate wholes. Under motor driven travel we have gasoline, electrical, and Diesel power conveyances.

area, and where farmers on an irrigated farm attempt to raise wheat, a dry land crop, on irrigated fields while their friends and neighbors, living on dry land farms, attempt to raise a garden.

Size of Farm Conditioned by Homestead Laws:—On the whole, farms are too small in the Great Plains region. This is the result of homesteading practices. The homestead laws are also responsible for the isolated farmstead and settlement practices. Generally speaking, a 160-acre farm is large enough to support a family in the Middle West and East, but not in the dry-land agricultural areas of the arid and semi-arid sections of the nation. Later adjustments in homestead legislation, to permit acquisition of larger tracts of land, were encumbered by much red-tape and other humid area ideas such as the requirement of growing trees during the "tree-claim" boom.[21] Also, much of this legislation came into effect after settlement had already taken place and some settlers were convinced that 160 acres was a large enough farm. Furthermore, settlement had often proceeded so far that the established pattern could not be easily changed.

"County Busting" as a Means of Livelihood:—In conformity with the midwestern idea that a county should consist of some combination or a multiple of congressional townships and that the county offices must be within close proximity of every farmer, "county-busters" made a living at breaking large counties into smaller units, baiting the various communities to offer concessions. A new Montana county emerged as recently as 1925 and there was considerable agitation very recently to create another county out of one of the smaller ones now in existence.

Farm Organization Modeled After the Midwestern Style:—Many Great Plains farms have been so set up that the high lands and benches were used for crops and hay fields, while the low lands were devoted to pasture. Any dams that were constructed to hold water were usually located along the section line so that the water

[21] Osgood, op. cit., page 194–195 has this to say: "Congress was not interested in the cattlemen and the methods they were evolving for the utilization of these regions. As on the old frontiers, they were regarded as merely an advanced screen ahead of the real conquerors of the land, the pioneer farmer. If the arid West did not welcome the farmer as the rich prairie soil had done, it might be induced to do so by congressional legislation. The thing to do was to adapt the High Plains to the farmer, and not the farmer to the High Plains. The Land Office and, through it, Congress was made to believe that if the western farmer were wheedled into planting enough trees, rainfall would be increased. . . . In 1873, Congress was persuaded to pass the Timber Culture Act. . . . Rain making by legislative fiat was something new."

could not be used on the operator's land except for livestock. Under these conditions of farm organization, it was impossible to use the spring and summer rain floods, under a flood irrigation system, without rearranging the entire crop, hay-land and pasture organization of the farm. Another illustration of unadapted farm organization is represented by events at Malta, Montana. Several thousand acres, now included in the Milk River Resettlement Project in Montana, were irrigated and irrigable farm land held by land speculators and used for grazing and wild hay, while hundreds of families were stranded on the adjacent dry land. By means of the project, the dry land farmers were moved to this irrigated and irrigable land. In this instance, individual rights and privileges for a few meant suffering for many, in addition to high costs of relief, tax delinquency, and other maladjustments. The project itself is an attempt to develop an adapted way of living.

Farm Ownership Ideals:—One of the major aims of the nation's agricultural goals has been to create ownership in land, especially small-scale entrepreneurship. This was expressed in the homestead program and again through the passage of the Bankhead-Jones Farm Tenancy Act. Undoubtedly, the merits of ownership are many, but the objectives behind it include the creation of respect for property, the development of personal initiative, participation in community activities and the implementing of social control. Ownership is, in reality, only a means to accomplish these ends, but long-term leases, with proper controls and adjudicating agencies, may serve as an equally effective means.

Without detracting from the merits of land ownership in the humid parts of the nation, it should be pointed out that ownership of all the land in a given farm unit in the Great Plains may be undesirable for the operator and society as well. There are many reasons for this, among them the larger size of the farm unit, the need for making adjustment to the fluctuations in precipitation, and the necessity for adjusting production to domestic and foreign market demands. It is probable that a major source of difficulty for agriculture in the Great Plains is not the fact of physical environment, namely the vagaries of a semi-arid climate; but the fact of imposing an unadapted ownership pattern upon an environmental area that requires a different type of resource control. Even today many counties in the Great Plains dispose of tax delinquent lands through private sales as quickly as possible. Some of this

land again returns to tax delinquency status in a short time.

Attempts have been made to handle such lands on a long-term lease basis. The creation of grazing districts, involving the use of privately owned, public and tax delinquent lands on a long-term lease basis may represent a more adapted method of resource control. The extension of this method of resource control to crop lands and to the control of a large part of the land in a given farm may represent an advantageous substitute for ownership in the Great Plains.

Financing Agriculture in the Great Plains:—Control of land resources cannot be separated from capital financing. Such financing has been a problem in the Great Plains, which is reputed to be a high-risk loan area. Agitation for a lowered interest rate has been a constant political issue, and the government has been forced to assume a large share of the farm financing. The Federal Land Bank is so financed and operated that it has the ability to carry farmers through a period of unusually low income and still keep up the credit structure of the organization.[22]

In the Great Plains, because of the peculiar and normal fluctuations in climatic conditions, loan repayments should be flexible. Such flexibility can be achieved in various ways, such as adapting the amount of loan repayments and rent or lease payments to the returns to the farm. Some credit agencies and land owners are experimenting with the idea of flexible repayments.

Is it possible to make further strides in developing an adapted credit system for the Great Plains and thus obviate the necessity of indefinite capital subsidy? Also, would such an adapted finance system have greater merit when it is recognized that the Great Plains is a population surplus area which furnishes youth to urban centers outside the region, all of whom have inheritance claims on the home farm?

The problem of developing an adapted technique of financing Great Plains' agriculture is closely related to the question of ownership or long-term lease in matters of resource control. The ownership philosophy was imported from outside the region, along with

[22] Much of business and industry operates indefinitely on a debt, namely the stock owned by shareholders. Agriculture on the other hand, was expected to repay a portion of the principal and interest, also, at regular intervals. When the Federal government entered the field of agricultural finance, it extended some of the financing advantages of industry to agriculture, and the future might mean further advances in this direction.

the finance pattern, and the major finance sources and agencies are still largely located outside the region and governed by problems and events in the more humid parts of the nation. Here we have two basic culture patterns that are closely allied to physical environmental conditions and their emergence as problem situations are more likely to appear in a semi-arid rather than a humid region. They are indications of a maladjustment between culture and the physical environment. An intelligent attack on the problem must strike at the root of the source rather than at the symptoms. Tax delinquency, excessive mortgage indeptedness, low income, lack of operating capital, and small farms are only symptoms, confirming the existence of basic maladjustments. The attack on the symptoms involves dealing with the basic source of the difficulties, among them being an adapted resource control pattern and an adapted capital financing method for Great Plains agriculture.

Area Diversification in the Great Plains:—Diversification of the single farm enterprise has long been a well established principle of good farming in the humid regions of the nation. It is necessary for the maintenance of fertility and yield and good management in getting the farm work done. Sound as the principle is in the humid regions, it has its disadvantages in semi-arid regions, especially where dry-land and irrigated farming are adjacent to one another. Much of the dry land area of the Great Plains can benefit only in a very limited manner from diversification; and when there is irrigated land nearby, the greatest social benefit to the larger community can be achieved by using the irrigated land in conjunction with the dry land.

This calls for the application of the diversification principle, not to a contiguous piece of land or farm unit, but to an entire area. This has been more commonly known as area diversification.[23] Under conditions of area diversification, most farm operators would have a piece of irrigated land; each would also have a piece of grazing land in a nearby grazing area and a piece of crop land in a better soil type area. None of the three pieces would necessarily be adjacent to one another. Diversification would be practiced from the standpoint of the farm operator, his production needs,

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[23] For a detailed discussion of this see E. A. Starch, "Type of Farming Modifications Needed in the Great Plains" in the February, 1939 issue of the JOURNAL OF FARM ECONOMICS, Vol. XXI, No. 1, pp. 114 to 120.

but not from the standpoint of contiguity in area of land in a single farm unit.

Such area diversification would approximate the condition of the village community of European origin; but it also has its counterpart in the grazing district and the forest grazing permit area in the United States. Sidewalk-farming in the Great Plains is a partial approximation, and some recently developed irrigation projects in the Great Plains have definitely had as their main objective the attempt to stabilize population on the irrigated and the adjacent dry-land area by working out plans of diversified relationships between the two closely related areas.

Such area diversification might prove to be an adapted way of farming in the Great Plains. Population might be concentrated more thickly in a relatively small area close to good roads, schools and other community services. The surrounding dry-land might be used for grazing and dry-land crops to supplement the home-base, the land being used in conformity with best land-use practices. Modern transportation and mechanization would favor such area diversification of agriculture. Would such a practice be a better adapted farming system than that now in existence on the Great Plains? Would it be possible to similarly relate to one another several more widely separated and different areas, tying together an irrigated base with a grazing area 100 or more miles distant?

Closely related to this culture pattern of area diversification are the previously mentioned patterns relating to farm financing, ownership and settlement.

Much of the History of Settlement Shows Importation of Culture Traits:—A study of the history of Territorial and early Statehood Days of the Great Plains Region shows that governors, judges, and other administrators, supported by well intentioned citizens from New York, Pennsylvania, Ohio, Indiana and other Eastern states often carried the humid area ideologies and practices into the semi-arid plains without making adjustments to local conditions. Frequently, the governors and judges became involved in intense conflict with local residents who wanted to have things done according to local conditions. Occasionally such officials were removed only to have others from the East replace them. Conflicts between cattlemen and agriculturalists, between farmers and miners, and between agriculturalists and towns-people sometimes had their origin in "what was the best way" to accomplish certain legal and governmental objectives.

Conclusion

It is readily apparent that many culture traits and patterns, imported from more humid parts of the nation, were ill-adapted to the semi-arid conditions of the Great Plains physical environment. Rehabilitation of people in the region will require changes in the existing culture in order to adapt it more effectively to the limitations imposed by the physical environment. Area diversification in farming is likely to be an adapted practice.

There are other concrete and potential settlement, farm organization, social organization, population distribution, and thought organization patterns that are better adapted to the region than those in operation at present. These concepts should probably originate within the region so as to become part of the culture. It is necessary for the Great Plains to have a cultural center of its own where adapted ideas are developed and promoted and where ideas and traits from outside the area undergo a test and modification in conformity with the needs of the region. Such a culture would not be totally different from that of the rest of the nation, but would be different at strategic points only.

Finally, this cultural approach to the study of regional problems offers an opportunity to solve some of the difficulties in other regions. A recognition of the need for an existence of regional cultures would make the development of a regional culture for the Great Plains an easier task. And lastly, this point of view should be kept alive during the war period, so as to get the post-war reconstruction to a quicker start and thus avoid much trial and error activity. This point of view should be kept in mind even while the war program is underway. The present demand for agricultural production is setting the stage for the encouragement of another attempt at introducing "humid" area ideology into the Great Plains. This is in prospect not alone for agriculture, but for industrial development as well. It is possible that unwise and unadapted industrial developments during World War II in the Great Plains may be the focus of later maladjustment in much the same manner that much unwise and unadapted agricultural development during the first World War was one specific source of two decades or more of difficulty in the Great Plains.

STABILIZATION OPERATIONS OF THE COMMODITY CREDIT CORPORATION*

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THE commodity loans, acquisitions, and sales made by the Commodity Credit Corporation in its price-stabilizing activities are commonly regarded as instruments for stabilizing prices over periods of time. It is not so generally recognized that the loan rates and release prices also play a part in stabilizing price relationships among different market points in the producing territory; that is, they may stabilize the price *surface* over wide areas of geographical *space*. In addition, they may stabilize price relationships at any one point in time and place among different *grades* of the commodity. This triple rôle of commodity loans, purchases and sales may be expressed in more formal theoretical terms as follows: they may stabilize prices, not only in time, but also in place and form.

The need for stabilizing prices arises from the inherent incapacity of the open competitive market alone to keep the production of agricultural products constant when the demand is constant, and changing in the right direction and the right amounts when the demand changes. It was formerly believed by many students of the subject that the best way to ensure this adjustment was to maintain a very sensitive market, in which prices were continually fluctuating in response to changes in supply and demand. From that point of view, proposals for stabilizing prices seemed like a step in the wrong direction. But actually the objective in stabilizing prices is not to slow up or block the operation of the laws of supply and demand in the open market, but to help them function better in the short run. The laws of supply and demand work out all right in the long run, like the laws of evolution in biology; but they are inaccurate, clumsy, and wasteful in the short run, particularly in the case of agriculture. There are two reasons for this:

* Journal Paper No. J-1024 of the Iowa Agricultural Experiment Station. This paper is an outgrowth of the research done under Project 722. It summarizes preliminary studies made in Washington in 1941 and continued at Iowa State College in 1942. I should be glad to hear from anyone interested in greater detail on particular points, particularly where others can provide analytical studies or factual data not at hand here. I wish to thank my colleagues T. W. Schultz and W. W. Wilcox for their criticisms.

1. The first and most obvious shortcoming is physical. In spite of all that can be done to plant the acreage that with average yields would grow the amount of food required to meet the conditions of supply and demand, each year unpredictable fluctuations in weather cause unpredictable fluctuations in yields and therefore in total production. The quantity produced may increase when demand is decreasing, or vice versa, because yields per acre fluctuate so much. In 1934, for example, and again in 1936, the yields of corn were 40 per cent below average. Farmers had to get along with a third less corn than the average amount on which their feeding systems were based. The organized speculative markets were designed to deal with short-time changes in supply, as well as with unpredictable changes in demand. But they were totally incapable of dealing with fluctuations in supply from year to year. Futures prices are quoted only 8 or 9 months ahead of delivery dates, and that is not much help in dealing with *annual* fluctuations over periods of years.
2. The second shortcoming of fundamental economic laws is also physical. Agricultural production cannot respond quickly to the unpredictable and frequently violent changes that take place in demand. Most arable crops are harvested only once a year. The time lag in production response for most crops, therefore, ranges up to 12 months. For hogs, it may be a year or more; for beef cattle, 3 or 4 years; and for orchard crops, 5 or more years. This means that when a sudden change takes place in demand, the production response must lag anywhere from 6 months to 6 years behind. Even if the erratic fluctuations in supply were smoothed out so as to give average yields each year on the acreage planted, changes in supply would still be a jump or two behind changes in demand.

The open competitive market in agriculture, therefore, does an inaccurate and wasteful job in the short run, because of unpredictable fluctuations in supply on the one hand, due to unpredictable fluctuations in the weather; because of largely unpredictable fluctuations in demand on the other hand, due to a multitude of economic, political and military causes; because of the complete lack of correlation between these two fluctuations in the short run; and because of an inherent lag in production response of from 6 months to 6 years. Changes in the quantity produced are never, except accidentally, adjusted accurately to changes in the demand.

The problem of maintaining a closer adjustment between changes in production and changes in demand in agriculture calls for supplementing the free market in two ways:

1. The first job is to *take out* the erratic fluctuations in market supplies from year to year that result from unpredictable fluctuations in the weather. It may not be possible to stabilize production, but the flow of products to market from an irregularly fluctuating production may

be kept stable by storage when crops are large and release of the storage stocks when crops are small.

2. The second job is to stabilize demand so that it does not change rapidly from one year to another. This involves stabilizing the whole economy, a large order indeed. Until this has been done, the job reduces to *putting in* the changes in production that are needed to meet fluctuations in demand.

The Federal Farm Board and its successor, the Commodity Credit Corporation, were set up to handle the first one of the two jobs outlined above. The primary objective of the original commodity loan programs, as Henry Wallace conceived it, was to stabilize prices over periods of time by storing excess supplies in years of large crops and releasing them in years of short crops, thus preventing fluctuations in production from having their natural effect on prices. The programs were designed to correct the inaccuracy with which the ordinary laws of supply and demand kept the production of farm products adjusted to changes in the demand for them because of unpredictable fluctuations in the yields per acre. If the open market functioned perfectly, prices would be uniform over time, space and form—uniform, that is, minus (a) storage charges from times of surplus to times of scarcity, (b) transportation charges from surplus to deficit areas, and (c) conversion charges from one form to another (or minus the difference in costs of production at different times, places and forms if these are less than storage, transportation and conversion charges). The ever-normal granary programs were designed to bring the behavior of agricultural prices closer to this ideal.

In actual operation, the ever-normal granary programs made good progress toward this objective. Their progress was hampered, however, by the fact that they were put to some additional uses for which they were not designed and could not handle. They were tied up with, not to say subordinated to, the price-raising activities of the Agricultural Adjustment Administration. In the early years, also, the programs did not fully recognize the importance of place and form, as well as time. It is instructive to observe how these departures from the ideal objectives outlined above produced sharp repercussions that soon forced the programs to operate more nearly in line with the objectives.

Stabilizing Effects on Prices over Time

The Commodity Credit Corporation was incorporated under the laws of Delaware on October 17, 1933. It started making loans on

cotton and corn immediately. The loan rate for the 1933 cotton crop was 10 cents a pound, and for the 1934 crop, 12 cents; thereafter, until 1941, the rates ranged between 8.3 and 10 cents a pound. The loans at these rates effectively stabilized cotton prices, in the face of a record large crop in 1937, within a narrow range, form 9.0 cents to 12.7 cents over the 8 years from 1933 to 1940 before World War II began. The prices and loan rates are shown in the upper section of Figure 1.

The loans on corn might have been similarly effective in stabilizing corn prices, but the corn crops in 1934 and 1936 were severely reduced by drought before stabilization stocks had been built up enough to fill them in; and after crops returned to normal, participation in the Agricultural Adjustment Administration program (which was necessary before a producer was eligible for loans at the full loan rate) was not always high enough to tie up enough corn for stabilization purposes. Nevertheless, the price of corn at Chicago stayed within a few cents of 50 cents for several years after 1937. It is estimated that the loans on the 1938 and 1939 crops supported prices about 18 cents a bushel. The prices and loan rates are shown in the middle section of Figure 1.

Loans were not made on wheat until 1938. They ranged from 59 cents to 64 cents from 1938 to 1940, effectively pegging the price of wheat at Chicago over that period between 70 and 85 cents a bushel. The prices and loan rates are shown in the lower section of Figure 1.

Space does not permit reporting the effects of the loans on the price of other crops, but the statistical evidence may be summarized in these terms: Over the 8 years of its operations, before the great increase in demand in 1941 and 1942 resulting from the war, the Commodity Credit Corporation rather completely stabilized the prices of the major farm products on which it made loans.

Effects on Carry-over Stocks

The Commodity Credit Corporation was more fortunate than the Federal Farm Board; it was born at the right time. The Federal Farm Board was set up in 1929, just before the beginning of a great depression, and lost heavily on the large stocks that it accumulated as prices declined. The Commodity Credit Corporation started making loans at the bottom of the depression, and hat operated on a rising price level almost continuously ever since. Yet

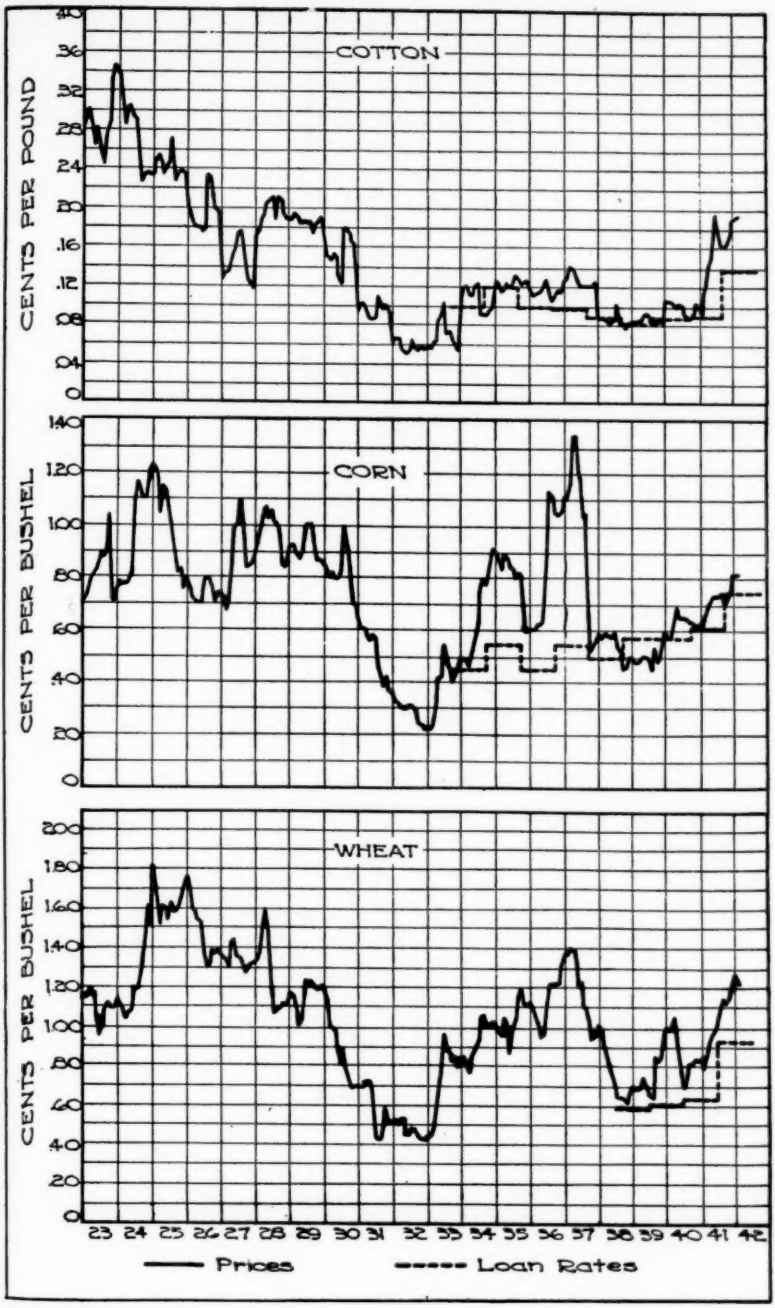

FIG. 1. PRICES AND LOAN RATES FOR COTTON, CORN AND WHEAT, 1923 TO 1941. THE COTTON PRICES FOR MIDDLING 7/8 INCH (15/16 INCH AFTER AUGUST 1941) SPOT COTTON AT 10 MARKETS; CORN PRICES FOR NO. 3 YELLOW AT CHICAGO; WHEAT PRICES FOR NO. 2 HARD WINTER AT KANSAS CITY. THESE PRICES ARE USED RATHER THAN PRICES RECEIVED BY FARMERS, BECAUSE THE LATTER INCLUDE UNREDEEMED COMMODITIES AT THEIR AVERAGE LOAN VALUES.

it encountered the same difficulties, only in less severe form, that wrecked the Farm Board. It lost a good deal of money, and accumulated such large stocks of several commodities that taking care of these stocks became a major problem. The growth in the size of the stocks of cotton, corn and wheat is shown in Figure 2. By the fall of 1941, the equivalent of a full crop of cotton, half a crop of wheat, and a quarter of a crop of corn had accumulated in store; by that time, some of the cotton stocks were 7 years old. Grain storage facilities were overburdened, and embargoes had to be applied at several terminal markets. The quantities of the various commodities under loan, and the quantities owned by the Commodity Credit Corporation, on December 31, 1941, are shown in Table 1. The total value of the commodities owned by the Corporation and of those pledged for loans as of that date was $1,356,961,000.

COMMODITY CREDIT CORPORATION
LOANS OUTSTANDING AND COMMODITIES OWNED DECEMBER 31, 1941
(All data in thousands)

	Loans Outstanding		Commodities Owned	
	Total Collateral Pledged to Secure Loans	Book Value[1]	Quantities	Book Value[2]
	Bales	*Dollars*	*Bales*	*Dollars*
Cotton	1,657	$116,597	5,575	$331,721
	Bushels		*Bushels*	
Corn	204,843	134,123	151,468	116,359
Wheat	351,746	344,375	166,855	164,192
	Pounds		*Pounds*	
Tobacco	63,174	8,674	286,887	76,824
	Bushels		*Bushels*	
Barley	16,369	6,425	66	35
	Bushels			
Grain Sorghums	101	28		
	Tons		*Tons*	
Prunes	78.0	3,474		
	Bushels		*Bushels*	
Rye	3,220	1,524	822	722
	Pounds		*Pounds*	
Naval Stores	800	8,136		
Dairy Products Purchases				1,922
Other Commodity Purchases				40,664
Grand Total	—	$624,522	—	$732,439

[1] Book values of outstanding loans held by banks and other lending agencies are face amounts only. Loans held by the Corporation include face amounts and all charges paid. Unpaid accrued charges are excluded.

[2] Book value of commodities owned includes unpaid accrued charges.

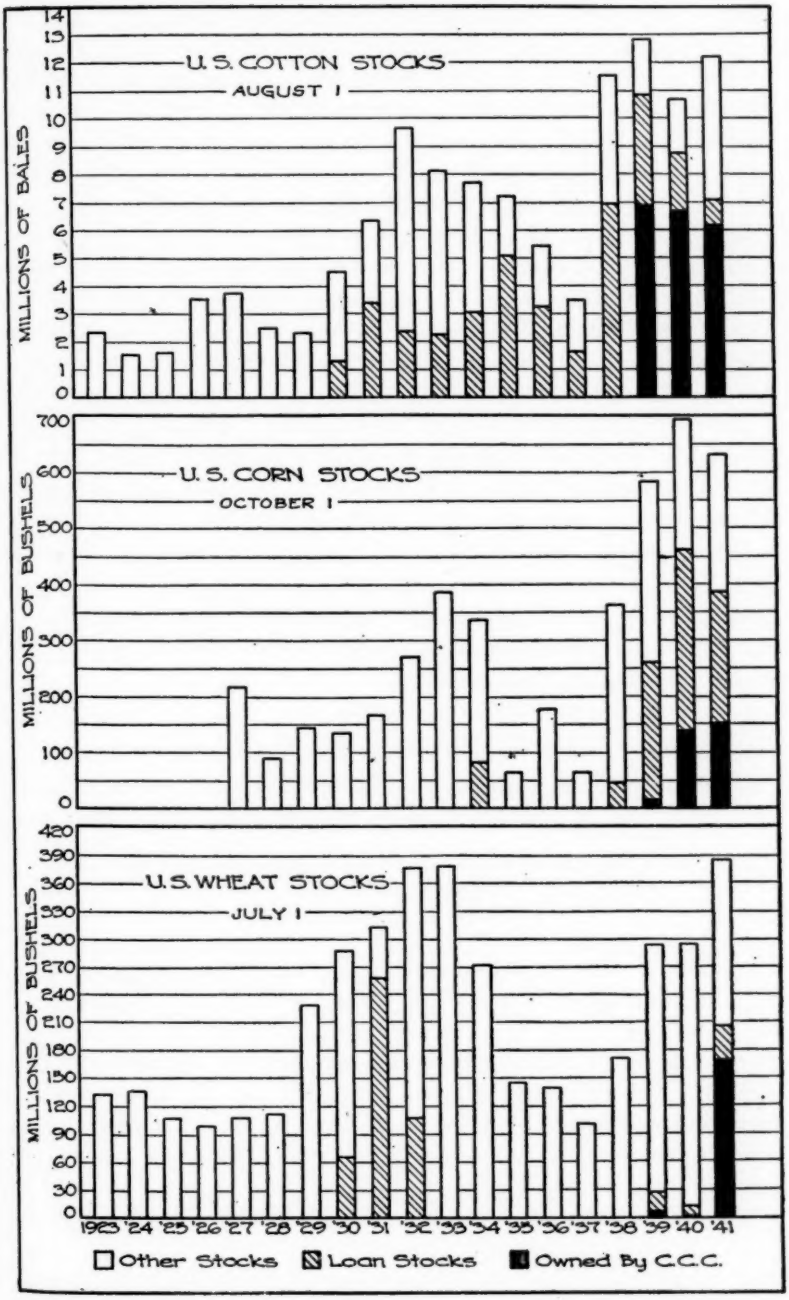

FIG. 2. QUANTITIES OF COTTON, CORN AND WHEAT OWNED BY THE CCC, UNDER LOAN, AND "OTHER," AT THE END OF EACH MARKETING YEAR, 1933 TO 1941. NO DATA FOR CORN BEFORE 1927. THE QUANTITIES SHOWN AS UNDER LOAN BEFORE 1933 ARE THOSE THAT WERE HELD BY THE FEDERAL FARM BOARD.

The operation of a stabilization program, of course, requires substantially larger stocks than were carried before; the only way to stabilize supplies is to carry over larger stocks from big crops than before. The stocks of wheat and corn that were accumulated by 1941 were only about the right size for stabilization purposes. Only in the case of cotton were the stocks clearly excessive—perhaps three times larger than required for stabilization purposes.[1] With the other commodities, the trouble was not so much that the stocks were large as that they had been built up over a period when the crops were only about average or slightly larger than average in size. The stocks had accumulated, not as the result of a conscious policy of witholding the excess over average production, but as an incidental result of attempts to raise agricultural prices over a period of time in defiance of the supply and demand situation. There were no signs that this price raising pressure would relax, and no signs that the stocks would be kept from growing larger. If a really big crop came along, the stabilization program would have real difficulty in taking care of it, since stocks were already large enough for stabilization purposes, and too large for existing storage and transportation facilities.

Financial Losses of the Commodity Credit Corporation

The financial losses incurred by the Commodity Credit Corporation each year are shown in Table 2. They are affected by inventory

TABLE 2. COMMODITY CREDIT CORPORATION DEFICITS AND SURPLUSES ("LOSSES" AND "PROFITS") BY FISCAL YEARS, 1938 TO 1941

March 31, 1938	Deficit	−$ 94,285,404.73
1939	Deficit	− 119,599,918.05
1940	(Surplus)	+ 43,756,731.01
1941	Deficit	− 1,637,445.51

gains ("paper profits") and losses, as demand increased or decreased. The gain for 1940 and the small loss for 1941 resulted because the demand in those years increased, market prices rose, and the paper profit was more than enough to offset the actual realized loss.

The losses were heaviest on the commodities with the highest

[1] The basis for this statement with reference to corn is laid down in U.S.D.A. Tech. Bul. 764, Controlling Corn and Hog Supplies and Prices, 1942. The statements with reference to cotton and wheat are tentative; they need revision by others more familiar with the conditions under which those commodities are produced.

storage costs. The losses on corn and naval stores were more than 10 per cent of the original loans.

When the losses on all commodities are corrected for paper gains and losses, with changes in the level of prices taken into account, they are equal to about 10 per cent of the value of the original loans. On the basis of an estimated business (volume of loans) of a billion dollars a year, the losses would amount to 100 million dollars a year.[2]

Reasons for Large Storage Stocks and Financial Losses

Why did the stabilization stocks grow so large, before the increase in demand resulting from the war in 1941 converted them from a burden into an asset, and why did the Corporation lose money at the rate of about 10 per cent of its loans?

The chief reason is that the Commodity Credit Corporation was following not only the objectives of an ever-normal granary program (by definition purely a storage and "unstorage" operation) but one or two other objectives as well. The loans were used, not merely to stabilize prices and hold prices at about the level at which average crops would move into consumption, but to raise prices above that level, depending on acreage reduction as a continuing feature of the program for raising prices (not merely as an emergency measure to be used as a last resort if stocks grew too large). This raising of prices was listed as the first of "the three fundamental functions of the (Commodity Credit) Corporation's loan programs: Namely, to protect and increase farm prices, to stabilize farm prices, and to assure adequate supplies of farm products" (i.e., to stabilize supplies). The loans were also used as an inducement to farmers to join in the production control programs.[3] And right from the first, severe restrictions were laid upon the quantities of cotton that could be sold by the Commodity Credit Corporation. In Section 381-C of the Agricultural Adjustment Administration Act of 1938 the Commodity Credit Corporation was prohibited from selling "more than 300,000 bales of cotton in any calendar month, or more than 1,500,000 bales in any calendar year."

The objectives specified for the Commodity Credit Corporation

[2] J. B. Hutson, President, Commodity Credit Corporation Address, "Looking Ahead at Our Financial Problems," U.S.D.A. Mimeo., Nov. 6, 1941.

[3] Report of the President of the Commodity Credit Corporation, 1940, pp. 4 and 6.

could have been followed without stocks accumulating excessively, if the loan rates set by the Corporation had been accompanied by restrictions of production severe enough to raise prices to the loan levels. But the Agricultural Adjustment Administration programs were unable to reduce production to that point, even though the general level of demand and prices rose almost continuously from 1933 on. The acreage of corn was reduced, but farmers grew other feed crops instead and the total production of feeds was scarcely affected.

The loan rates were originally set at the discretion of the Secretary of Agriculture. In the Agricultural Adjustment Administration of 1938, however, Congress began to circumscribe the Secretary's power by specifying the range (from 52 to 75 per cent of parity) within which the loan rates had to be set for wheat, cotton and corn. In Public Law 74, approved May 26, 1941, Congress went further and took the matter out of the Secretary's hands entirely; it directed the Commodity Credit Corporation to make loans on the basic crops at 85 per cent of parity. That law is still in application.

In the future, it would seem advisable to do either of two things: (1) Free the Commodity Credit Corporation from the objective of raising the level of prices, and leave it to pursue the one objective that a storage agency can handle properly (stabilizing supplies and prices without raising the level of prices over a period of years) or else (2) incorporate the Commodity Credit Corporation into a different kind of program entirely.

If the first alternative is followed (the second alternative is examined later), the loan rates should be dissociated entirely from parity or any other price-raising objective extraneous to a supply-stabilizing agency, and set each year at the proper level for stabilization purposes—the level at which a crop of average yields on the acreage harvested could be sold. Even this policy would involve the Commodity Credit Corporation in considerable losses. It would completely stabilize supplies, and if demand remained constant that would completely stabilize prices. There would be no rise in prices from years of large crops to years of short crops to induce farmers to redeem their loans. The part of the crop that the Commodity Credit Corporation took over would be sold after a year or more at the same price at which it had been acquired. The Corporation would lose by the amount of the storage costs.

Strict conformity with the ideal of market perfection over periods of time, and with ordinary business principles, would require that the loan rates in years of large crops would be set a little below the level at which an average crop would move into consumption, so that there would be enough rise in prices from large crop years to small crop years to cover the costs of storage.[4] The conclusion does not necessarily follow, however, that the Commodity Credit Corporation should conform with this ideal of market perfection and ordinary business principles. The Commodity Credit Corporation is no ordinary business, and the ideal of market perfection conflicts with another ideal, that of production and distribution at the scale which permits the lowest costs. Preliminary calculations indicate that the nation as a whole is better off to have agricultural prices completely stabilized, rather than left with enough fluctuation to cover storage costs. Complete stabilization permits the producing, processing and distributing machinery to operate on the scale that results in minimum cost, instead of suffering from an overload one year and an underload the next. The gains from complete stabilization are probably greater than the costs; and since the same body (the whole nation) that gets the gains pays the costs,[5] complete stabilization is probably better for society as a whole than stopping short of the goal and leaving enough fluctuation in price to cover storage costs. But the problem should be investigated further; the answers might differ for different products.

Another problem that should receive attention is the effect of complete stabilization on farmers' incomes. Obviously, if prices are stabilized, gross incomes would fluctuate directly and proportion-

[4] Something of this sort was attempted in the first few years of the operation of the corn loan program, when the rates were set lower when crops were large than when crops were small; it may also have been in the minds of those who set up the schedule of loan rates for corn in the Agricultural Adjustment Act of 1938—rates that varied inversely with the size of the crop. But with that exception, the loan rates for the various crops were set at certain percentages of parity, regardless of the size of the crop, and in most cases above the level at which an average crop could be sold.

[5] This, by the way, is one of the reasons why a government agency can do a better job of stabilizing prices than a private agency. The only source of gain to a private agency, by which it can cover its storage costs and continue in business, is the rise in prices from years of large crops to years of short crops; it must therefore stop some distance short of complete stabilization. But a government agency can go all the way to complete stabilization, lose money by the amount of the storage costs, and legitimately call upon the Treasury to restore its losses. For the Treasury gets its funds from taxes, which come from the nation as a whole, which gets the benefits from stabilization.

ately with the size of the crop; stabilizing prices unstabilizes incomes. Incomes could be stabilized, as well as prices, if the loans on the excess over average production were made in some non-negotiable form, convertible into money only when the excess was sold in some later year of short crop. But the administrative difficulties of handling loans in this fashion may be prohibitive.

Seasonal Movements. The loan rates of the Commodity Credit Corporation in the past have ignored storage costs within the season, as well as from year to year. Normally, the price of a product is lowest at harvest time, and rises throughout the season thereafter enough to cover the storage costs. The loans, however, have been made at a flat rate throughout the season. A flat loan is more attractive (higher in relation to average prices) early in the season than late. This is one of the reasons why sealing operations are concentrated so heavily in the few months after harvest. In cases such as corn where the bulk of the commodity under loan is ordinarily stored on the farm anyway, this flat rate does not make much difference; it affects only the paper work involved in making the loans. But the bulk of the wheat and nearly all of the cotton under loan is stored in elevators and warehouses. The heavy rush of sealing early in the season overtaxes the transportation and storage equipment for handling the physical commodity. There might be a net gain from putting a seasonal differential in the loan rate, so that the rate would rise from month to month after harvest about as much as the average seasonal rise in prices before loan programs were instituted, or even more than that. It would depend on the comparative costs of storing on the farm and in private elevators and warehouses, and upon the reductions in transportation overload if the movement were spread more evenly through the year.[6] More research is required here also.

Seasonal price movements are of less importance to a stabilization agency like the Commodity Credit Corporation which deals with durable products than to an agency that deals with perishable products as well. But any price-controlling agency dealing with *perishable* products would almost have to give seasonal price movements careful investigation, both because they are usually

[6] A step in this general direction has already been taken. The price at which the Commodity Credit Corporation releases corn that it owns is not a flat price through the season. In the fall of 1941, the Corporation took the costs of storage into account in its release (sale) prices by setting the release prices for corn each month equal to the loan rate plus half a cent a month after December. The release price thus rises through the season like the open-market price used to rise.

large and because perishable products cannot be stored for long. There is usually some one time in the season when the product can be produced most cheaply. The heavy supplies at that time depress prices until the average seasonal price movement approximates the cost of producing the product at different times in the year. A flat price ceiling or floor through the season would encourage a great concentration of production in the low cost months and a scarcity of the product in the rest of the year, thus overburdening producing and handling facilities at one time and leaving them largely unutilized at another. This point becomes particularly pertinent now that retail price ceilings have been imposed.

Place

The Commodity Credit Corporation loans on cotton and corn were made originally at a flat rate over the entire producing area. Normally, however, the price surface for any farm product is lowest in the regions of heaviest production relative to consumption, and slopes upward to the regions of greatest consumption relative to production. A flat loan rate is relatively more attractive in the low-price, heavy-producing areas than in the high-price consuming areas.

It was believed that this was the reason why more of the product (in percentage of local production) moved into storage in the low-price areas than in the high-price areas. The situation for cotton in 1938, the last year when the flat loan rate was used, is shown in Figure 3A. In this chart the quantity of cotton stored in each state is shown in relation to the location of the states ranged in geographical order from west to east. The farther west the states lie from the heavy consuming areas in the east, the higher is the percentage of the cotton crop put under loan. The four central southern states, Arkansas, Louisiana, Mississippi and Tennessee, are out of line with the rest (higher than the rest) for reasons that are examined later.

In an attempt to correct this uneven concentration of cotton under the flat loan rate, the Commodity Credit Corporation introduced location differentials in cotton loan rates in 1939. These differentials were based mostly on freight rates to the concentrated mill areas in the Carolinas and to the Gulf ports. Similarly, when the wheat loan program was initiated in 1938, location differentials were instituted for that commodity, based on freight rates from each point to the appropriate terminal market.

In the case of corn, a flat loan rate had been in effect from the first, and corn piled up in the western Corn Belt states in much the same way as cotton in the western cotton states. This is shown in Figure 4A. The Commodity Credit Corporation put location differentials in corn loan rates into effect in 1941. The differentials were based, not on freight rates (since 85 or 90 per cent of the crop

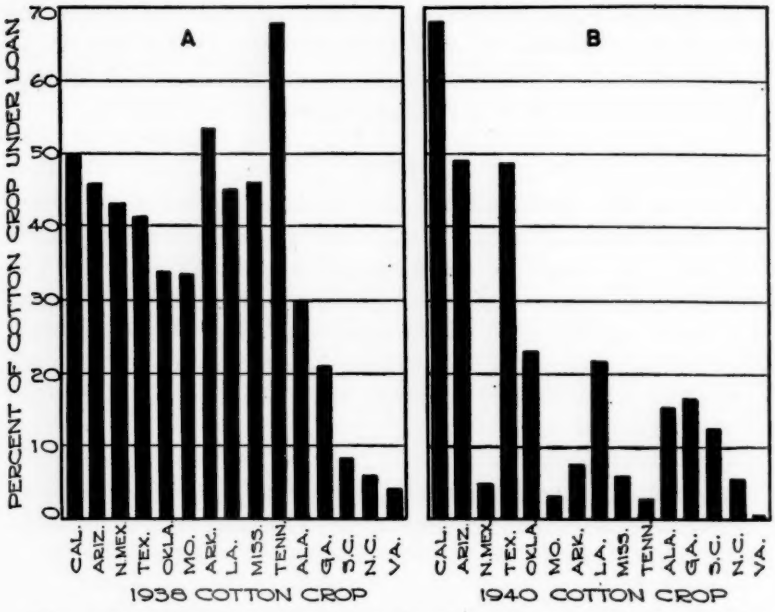

FIG. 3. PERCENTAGES OF THE COTTON CROP PUT UNDER LOAN IN EACH STATE. A FLAT LOAN RATE WAS USED WITH THE 1938 CROP; LOCATION DIFFERENTIALS WERE USED WITH THE 1940 CROP.

is not shipped as corn but is fed to livestock on farms close to where it was grown), but on average prices in each crop reporting district, broken down by counties.

Have these location differentials in the loan rates for cotton and corn removed the tendency for stocks to accumulate most in the low price areas? They have had some effect in the case of cotton, but they do not seem to have had much effect on corn. Figure 3B shows that stocks of cotton of the 1940 crop, after location differentials had been put into effect, continued to pile up in the extreme southwestern states, California, Arizona and Texas, even more than before; but New Mexico, Oklahoma and the four south

central states that were high in 1938 were brought down to about the same levels as the eastern states in 1940. Evidently, some other influence than the flat loan rate must have caused farmers in the extreme southwest to put more cotton under loan than eastern farmers. This other influence also had an upward effect on the four central southern states shown above in 1938, and a downward

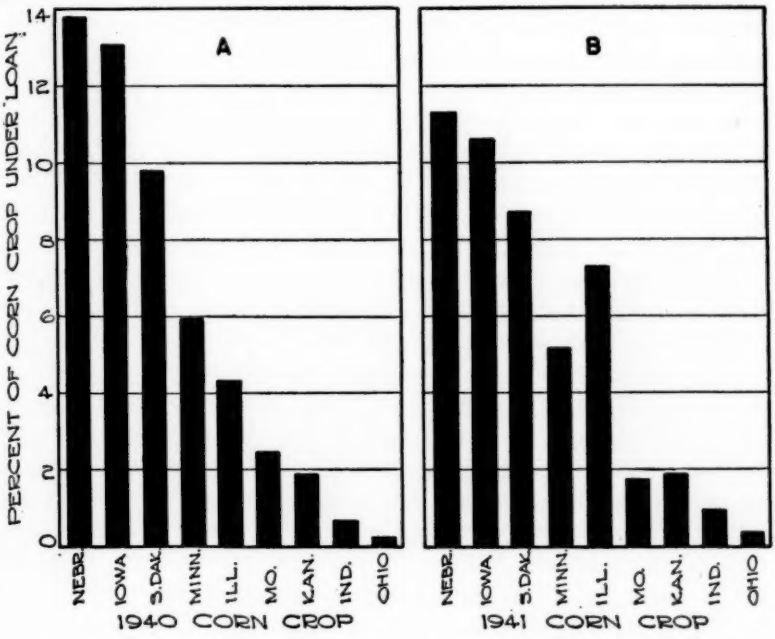

FIG. 4. PERCENTAGES OF THE CORN CROP PUT UNDER LOAN IN EACH STATE. A FLAT LOAN RATE WAS USED WITH THE 1940 CROP; LOCATION DIFFERENTIALS WERE USED WITH THE 1941 CROP.

effect in 1940. It may be that farmers in the west put more cotton under loan than farmers in the east, not because of the flat loan rate but because of the reduced export demand, which affected western cotton (which had never been used extensively by domestic spinners) more than eastern cotton. The change in position of the four central southern states remains unexplained. It may be a matter of grade or staple length. I am forced to leave this problem to others who are more familiar with cotton. Even they disagree.[7]

[7] Howard A. Akers, Current Farm Economics, Oklahoma, April, 1941, pp. 46–53, discusses this question. But Ralph Raper, cotton economist in the Commodity Credit Corporation, does not agree with Akers' conclusions.

The location differentials in the loan rates for corn have only slightly corrected the tendency for corn to accumulate heavily under the loan in the western corn belt states. Figure 4B shows that the heavy concentration of sealings in the eastern states continued after location differentials were introduced, much the same as before. This cannot be explained by changes in export demand, nor by grade considerations. It is probably related to the great increase in the numbers of livestock requiring feed in the areas of heavy corn production in 1941–42 (farmers wanted to retain supplies on their own farms for future feeding), to unusually high yields in those areas in 1939–41, and to the fact that these areas commonly ship out up to half of the corn they produce and therefore have large surpluses of corn available to put under the loan if it is higher than the market price. Research on this question is still in progress.

The experience of the Commodity Credit Corporation with location differentials, and the research done in that field, has brought some interesting facts to light. The first fact is that the price surface for some of these products, while not flat, is not a simple sloping surface either. It does not rise smoothly from surplus to deficit areas by the amount of the transportation charges. It is an unevenly sloping surface. Second, this uneven surface changes violently from year to year, and even from month to month and day to day. A study of corn prices in Iowa, Indiana, and Ohio, shows that over the past 16 years the price of corn in Iowa fluctuated rapidly from month to month, from 19 cents below the Ohio price to 23 cents above it—a total range of 42 cents. The price surface for pork is similarly unstable; the weekly prices of pork loins at Chicago in 1941 ranged from $1.50 per hundred pounds below New York prices to $1.05 above them, a total range of $2.55. The price surfaces for wheat and cotton are also unstable, although the percentage changes are less than those for corn. Finally, the price surface for corn, unstable and changing as it is, apparently was not flattened out by the flat loan rates used before 1941. The flattening that did take place resulted as in earlier years from changes in relative corn production, not from the flat loan rate.[8]

[8] Geoffrey Shepherd, Controlling Corn and Hog Supplies and Prices, U.S.D.A., Tech. Bul. 764, 1942.

Form

Up to 1938, cotton loans were made at a flat rate regardless of grade and staple length. The producer of the shorter staple and lower grade cotton, therefore, got a higher loan in relation to the value of his cotton than the producer of long staple and high grade cotton. This anomalous situation was corrected by the introduction of differentials in the loan rate for different grades and staple lengths of cotton in 1938. These differentials were based upon the average price for each staple length and grade at the 10 spot markets for the 10 months, August, 1937, to May, 1938. Loan rate differentials for grade and staple length have become a permanent part of the cotton loan programs ever since. The schedule of premiums and discounts for the different staple lengths and grades of cotton, shown as so much "on" or "off" the basic loan rate for 15/16 inch cotton, is published each year by the Commodity Credit Corporation in mimeographed form early in the calendar year. The schedule for 1942 covers two single-spaced typewritten pages, and is accordingly too large to reprint here.

The changes in the differentials for staple length from 1938 to 1941 are shown for the one grade, Middling White Cotton, in Figure 5. In most cases, the differentials for the longer staple cotton have increased each year since 1938. The differentials for the shorter staple cotton, (1 1/16 inch and less) however, narrowed from 1938 to 1939, and were changed only slightly thereafter, until 1941.

The loan differentials for these shorter staple lengths during the years from 1938 to 1941 were wider than the premiums and discounts actually paid in the open market. The reason for this was the fact that the loan differentials each year were based mostly upon the market differentials existing during the last 10 months of the preceding year, and these market differentials narrowed each year from 1936–37 to 1939–40. The loan differentials were set wider than the actual market price differentials existing at the beginning of the crop year (August, 1941) but the market differentials soon widened as the year progressed until they were considerably wider than the loan differentials.

There seems to be some question about the effect of the wide loan differentials (wider than market price differentials) from 1938 to

1940. One observer[9] believes that the high loan rates for the longer staple cotton caused a high percentage of this long staple cotton to be placed under loan, while the opposite happened to short staple cotton, which moved into consumption instead. This made the open market price differentials narrow still further.

But another observer[10] disagrees with this analysis. He states:

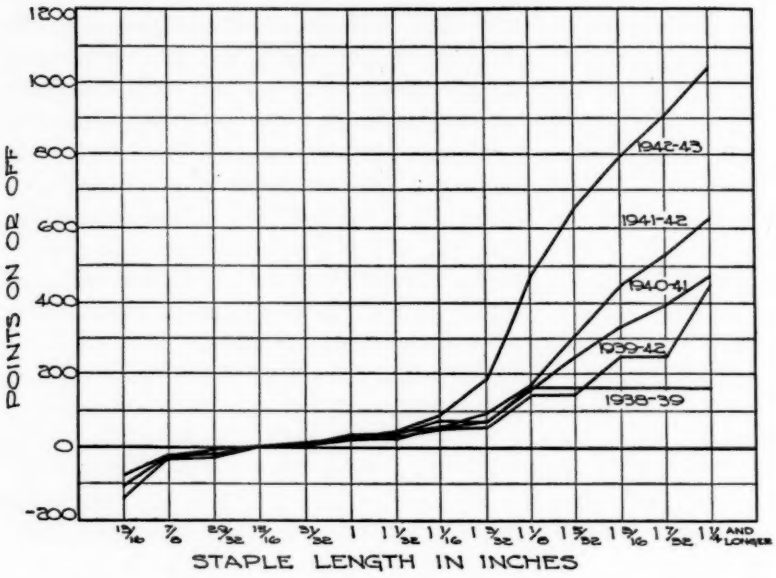

FIG. 5. COTTON LOAN DIFFERENTIALS FOR STAPLE LENGTH FOR MIDDLING WHITE COTTON, 1938–39 TO 1942–43. BASIC STAPLE LENGTH, 15/16 INCH. MOST OF THE PREMIUMS ABOVE 1 1/16 INCREASED FROM 1938–39 TO 1942–43, BUT MOST OF THE PREMIUMS AND DISCOUNTS BELOW 1 1/16 NARROWED.

"If (Akers') contention were true (long cotton has gone into the loan) then it would seem to me that the carry-over of short cotton would have decreased much faster than the decrease of short cotton in the crop. As a matter of fact, the short cotton in the carry-over has not decreased as fast as the decrease of these staples in the crop. Neither do the disappearance figures bear out his contention. I have no reason to believe that premiums and discounts, as applicable to the loan, have materially affected the disappear-

[9] Howard A. Akers, pp. 46–53, "Current Farm Economics, Oklahoma" April, 1941.

[10] Ralph Raper, of the Economics Division, Commodity Credit Corporation.

ance of the various qualities of cotton." Here again I must leave the question for cotton men to settle.

There seems to be general agreement on a different aspect of the cotton differentials. Most observers agree that the loan differentials for staple length have one clearly beneficial effect in removing one shortcoming of local cotton markets; these local markets previously reflected only part of the differentials paid for staple length in the central markets.[11] This tendency to pay less than the full differentials for different qualities of the product is a common defect of local markets; it is true of local markets for other commodities, as well as for cotton. Under the loan program, to the extent that the loan differentials reflect actual price differentials in the central markets, those differentials become fully effective in the local markets. Farmers are therefore given the full incentive for raising the longer staple and higher grade cotton. Research is needed to show what effects this has had on the production of cotton of different grades and staple lengths, and to show which grades and staple lengths have accumulated under loan and in the hands of the Commodity Credit Corporation, and why.

Wheat. There are many different classes and sub-classes of wheat. The differentials between the loan rates established for the basic grades of each class and sub-class are established separately for each important terminal market, and differ from one market to another. The differentials in the rates for the different grades above and below the basic grade for each class and subclass also differ from one market to another. The schedule of differentials is therefore too long and detailed to reproduce here; it may be obtained upon request to the Commodity Credit Corporation. In the main, the differentials are based upon the average price differentials over a recent period of years. Each year, revisions are made to take current conditions into account, but the changes in recent years have been few and slight. Here is another fruitful field for research, in order to show how closely the loan rates approximate average farm prices before the loan program was begun, and what effects they have had on the accumulation of different classes and grades of wheat in store.

[11] L. D. Howell and Leonard J. Watson, 1939. Cotton Prices in relation to cotton classification service and to quality improvement. U. S. Dept. Agr. Tech. Bul. 699, 55 pp., illus.

T. R. Hedges, "Quality-Price Relationships of Cotton at Local Markets in Oklahoma," Oklahoma Sta. Bul. 250 (1941).

Improvement in Local Markets

The experience of the Commodity Credit Corporation has shown that a price-controlling agency needs to give careful attention to differences in the values of the different grades of a product. When a flat loan rate, price ceiling, or floor is set, ignoring differences in grade or quality, a form of Gresham's law comes into play and an incentive is set up for bad products to drive out the good. Average price differentials between grades, and the reasons for changes in the differentials from time to time and place to place, need investigation, so that the loan or ceiling price differentials can be set accurately. Price differentials between different grades of a product may be as important as price differentials between different market points in space.

Price control agencies have an opportunity here to rectify a common shortcoming of local or country markets for farm products. The Commodity Credit Corporation illustrates a means by which some major improvements in agricultural marketing may be made in the future. In most country markets, either the product is bought at a flat price regardless of grade, or the range of prices paid for the different grades is much narrower than the range in the actual value of the different grades. This subsidizes the production of low grade products at the expense of high grade product. Marketing men have worked for years to rectify this defect in country markets. Some progress has been made, but the job is so inherently difficult that marketing programs designed to help farmers appraise complicated grade and value differences accurately out in the country markets where they sell the product may be reaching their limits. The Commodity Credit Corporation, with its differentials in the loan rates for different grades of products, coupled with objective determination of the grade by impartial government graders, has been able to carry value differentials clear back to the farmer and solve the problem at one stroke.

Appraisal

On the whole, the Commodity Credit Corporation has been rather successfully performing the ever-normal granary job—taking out erratic fluctuations in market supplies from year to year. The commodity loans have proven to be an effective device for smoothing out fluctuations in supplies and prices, and as experience accumulates, the Commodity Credit Corporation may be expected

to maintain and improve its past good performance. The Corporation is succeeding where many voluntary cooperatives failed in the early days when they attempted "orderly marketing" and "commodity control"—a job that in most cases lay beyond their powers. The Corporation is in a sense the embodiment of the idea of "compulsory cooperation" which cooperators began to envision when voluntary cooperative programs of price control benefited outsiders more than members and thus by their initial success brought about their own downfall.

The Commodity Credit Corporation stabilization operations are also playing an important rôle with respect to place. They may replace or supplement the operations of voluntary cooperatives in the field of "market distribution" or "market selection," and reduce or do away with the present need for telephoning and cross-hauling on the part of individual farmers and dealers as well. And, finally, the differentials in the loan rates for different grades of products may complete the programs for carrying value differentials clear back to the farmer which previously were reaching a plateau on the basis of improving the plane of the competition at the local market. In the three aspects of the ever-normal granary job—time, place, and form—the Commodity Credit Corporation offers new solutions for old marketing problems.

But in other directions the Commodity Credit Corporation has been asked to do too much. Its activities have been directed not only toward the physical job of stabilizing market supplies (the original purpose of the ever-normal granary plan) thus also stabilizing prices about the levels indicated by average supply and demand, but also toward raising prices above those levels. This second objective lies outside the powers of any storage and unstorage agency like the Commodity Credit Corporation, just as the ever-normal granary type of supply-stabilizing operations do lie within the powers of the Corporation but did not lie within the powers of cooperative associations, and wrecked a good many of them when they attempted that job.

When price levels cease to rise, or still more, if they should fall, stocks are likely to accumulate more than they did while price levels were rising. The Commodity Credit Corporation by itself can handle this problem only if it is free to reduce loan rates and prices. Raising prices over a period of years, toward parity or any other objective, can only be done by reducing acreage or increasing

demand. These are jobs for the Agricultural Adjustment Administration and the Agricultural Marketing Administration. If they cannot handle them, the Commodity Credit Corporation should not be burdened with them. All that the Commodity Credit Corporation can do is take out fluctuations in prices from year to year about the level set by the Agricultural Adjustment Administration and Agricultural Marketing Administration. By itself, it cannot raise that level and make it stick; it can only take supplies off the market at one time and put them back at another.[12] And if it can only put them back slowly, as in the case of cotton, it is handicapped even in doing the job it could do if it were left free to do it.[13]

The activities of the Commodity Credit Corporation, the loaning agency, the Agricultural Adjustment Administration, the production control agency, the Agricultural Marketing Administration, the marketing and consumption agency, and the Department's policy with respect to the forward price floors, need to be more clearly distinguished and properly coordinated in the development of a unified over-all agricultural price policy.

[12] Prof. Roy A. Ballinger, of Louisiana State University, comments on this point: "You argue in your article that the ever-normal granary should not be used to raise prices. I agree with you, but it seems to me that the cotton loans, which you present as a part of the ever-normal granary, have been viewed in that light by very few people, except perhaps a few officials in Washington. Certainly the cotton farmers, the cotton trade, and the Agricultural Extension Service have looked upon the cotton loans as a price-raising device and have given very little attention to the idea of an ever-normal granary. It seems to me that Congress has taken the same view. If this is true, much of your discussion of cotton loans as part of an ever-normal granary is far removed from the actual situation. I believe that some more explicit recognition of this fact in your article would be desirable."

[13] Early in June the Commodity Credit Corporation announced "that no cotton would be sold by Commodity Credit Corporation under the General Cotton Sales Program during the month of June. "The remaining 177,636 bales of cotton that can be sold during the calendar year 1942 within the limitation of 1½ million bales specified in Section 381-C of the Agricultural Adjustment Act of 1938, as amended, will be held until the requirements for export sales and sales for new uses are determined." (Press release, June 3, 1942.) It was apparent that the Corporation had sold almost its full quota for the year in the first five months of the year.

CONSERVATION EXPENDITURES ON FEDERAL LANDS

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THERE is a growing recognition of the importance of economic principles in the formulation of sound policies controlling the conservation or best use of our publicly owned resources. The economic relationships existing among land, water, forage, forest, mineral and wildlife resources and the respective and aggregate economic influences of these resources and relationships on individuals, local communities, and the national economy are subjects receiving increased attention in the JOURNAL and elsewhere.

One of the most difficult questions to answer in this field is how much public money should be spent on conservation projects. This brief exposition will be confined to observations on a possible approach to a solution of this question, having in mind particularly Federally owned rural property now being held and managed for conservation purposes. It is essentially an attempt to develop some logical signposts rather than an empirical illustration of methodology.

This problem has received comparatively little analytical study by agencies of the Federal government. The depletion of our resources has been so great and the need for conservation so pressing that most individuals guiding our conservation efforts have taken the justifiable position that there is no danger of too much public spending for this end. There are, however, two circumstances which may endanger future conservation appropriations. The first is present or prospective demand upon the Federal treasury for large sums for "the sinews of war," agricultural-industrial income parity, subsidized exports, foreign loans and post-war relief. This demand may require curtailment of appropriations for the regular or non-emergency governmental services. The second circumstance is one for which conservationists themselves appear partly responsible. Whereas much has been said of the need for conservation, relatively little quantitative information has been presented to the public and to Congress designed to show the value of the

[1] Although useful comments and suggestions have been received from professional colleagues and others, the views expressed represent only the personal opinion of the author.

returns from conservation expenditures. In view of the competition among the many regular functions of the Federal government for treasury funds even during "non-emergency" times and in view of the increasing competition for funds between the regular and the emergency functions, it seems incumbent upon conservationists to show as quantitatively as possible the present value of the returns or benefits from conservation expenditures so that Congress and the public may judge better the social and economic importance of conservation and its proper place in the realm of Federal fiscal policy.

The proposal that is here considered is presented with full appreciation of its highly complex nature. The purpose has been only to outline the more important basic concepts that appear to be involved and to supply a skeleton framework of procedure upon which may be constructed, after much additional study, a workable and satisfactory methodology. Since this attempt is embryonic and some principles delineated are controversial, it is admittedly vulnerable to searching review and criticism.

In the discussion that follows "conservation" is taken to mean the management of the resources of all units of Federal land for maximum aggregate sustained economic returns. By "economic returns" is meant "the economic values of all products and services resulting from the expenditures of public money, including those items the values of which must be estimated in view of the fact that they are not exposed to the pricing process in any ordinary market sense."[2]

It is proposed that the advisability of investment of funds in any existing conservation project whether a national forest, Indian forest, national park, grazing district or wildlife refuge be tested by a consideration of the costs of and returns from such investment.[3] It is suggested that the net rate of return per investment dollar be determined currently for each established conservation project. This procedure would require the adoption of an account-

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[2] Alf Z. Nelson, "Comments on Connaughton's definition of watershed management." *Jour. Forestry* 38(4): 365. April, 1940.

[3] "It may be observed . . . that every decision involving governmental investment policy should be made in the light of the most accurate and complete balance sheet of social costs and returns that can possibly be computed for each individual project." R. W. Nelson, "Controlled burning at $40 per acre; is it socially justifiable?" *Jour. Forestry* 37(10): 816–817. Oct. 1939. Also see: "In defense of an economic approach to public forestry." *Jour. Forestry* 38(7): 593–595. July, 1940, by the same author

ing system based on the type common among private corporations. The books would be closed annually and a statement of profit and loss and a balance sheet would be prepared. It is readily admitted that this procedure would in no instance be a simple undertaking and that projects such as wildlife refuges whose returns are not of substantial direct monetary importance would present complex and perhaps unsolvable problems.

We have this situation to face, however. Expenditures of the Federal government are in dollars. A national forest, for example, receives dollar appropriations each year for regular operating purposes. Therefore the returns should also be expressed in dollars to the fullest extent possible so that a basis of comparison with costs can be established. We must translate, somehow, those returns which are not subject to the pricing system into dollar values upon the best basis of estimation or value judgement possible and then include them as credit entries in the conservation ledger.[4] Many persons feel that this cannot be done. It is believed that if the objective be clearly defined and exhaustive studies of the many facets of the problem be undertaken, a large measure of success can be expected. Weeks and Josephson point out that the procedure of placing definite values on returns of this kind" . . . at least at first, would necessarily be in part qualitative and in part quantitative."[5]

Without doubt the intangible or "non-vendible" returns from many conservation areas are of great economic importance. The watersheds of the Angeles National Forest, California, is a classic example. The wage income resulting from the manufacture of raw materials produced on conservation lands could not ordinarily be counted. However, if this wage income displaced essential unemployment relief expenditures there would exist cause for including such returns. This would presuppose that no alternative employment opportunities were obtainable and that no less costly form of relief was available.

Care should be exercised so that utilities which normally have

[4] " . . . Even with intangible values (from public forestry) . . . , it is necessary to have some estimate of what they are worth. Costs cannot be entirely ignored. There must be some limit beyond which expenditures to achieve a result that is in itself highly desirable are not justified." Samuel T. Dana, "The Outlook for Forestry," Yale Forest School News 28: 41. July 1940.

[5] David Weeks and H. R. Josephson, "Economic criteria for classifying non-urban land according to probable best use." JOUR. OF FARM ECONOMICS 21(2): 427. May 1939.

little or no economic value would be properly evaluated or excluded from the accounts. For some utilities no one would voluntarily exchange money for the reasons that they are lightly esteemed or could be gotten free elsewhere. Thus, for example, if no one would be willing to pay any money directly or indirectly for the use of a public campground were they asked to do so, it would yield no economic return.

Care should be exercised, also, so that when the financial accounts of the conservation projects were being prepared imputed interest would not be overlooked.[6] The interest to be charged would be taken here as equal to the economic rate of pure interest (hereafter termed "economic interest") as measured by the yield on long-term, highly marketable, tax and risk-free bonds or comparable income-producing investments.[7] Projects whose total annual returns equalled or exceeded total annual costs, including economic interest as a current operating expense, would be able to charge off interest from annual returns. Projects whose returns were deferred in whole or in part would have to carry total accumulated costs (or the part thereof which could not be balanced against annual returns) at compound interest until accumulated costs and returns did balance. This would be the case for many of the eastern national forests which because of the badly depleted condition of their timber stands require rehabilitation and a long period of waiting before they will become widely productive. This would be true, likewise, for some western grazing districts which were withdrawn only recently from the public domain and from free and unrestricted use. On the foregoing premise when costs and returns balance, economic interest would have been earned even though it be included as a cost for accounting purposes. And when returns exceeded costs, the enterprise would have earned profit.[8]

[6] For a very enlightening discussion of the theoretical basis for the use of interest in connection with public expenditure for conservation see: Arthur C. Bunce, "Time preference and conservation." JOURNAL OF FARM ECONOMICS 22(3): 533–543. Aug. 1940. R. C. Staebner, "The problem of interest in forestry." *Jour. Forestry* 29(5): 763–767. May 1931; and R. W. Nelson, "Controlled burning, etc.," op. cit., pp. 815–816.

[7] Fred R. Fairchild, and Assoc., "Forest taxation in the United States." Misc. Pub. 218, U. S. Dept. Agr. 1935. p. 583.

[8] In ordinary private business accounting the only type of interest usually considered is loan interest representing the cost of borrowed money. It is entered in the ledger account as an operating expense item. Economic interest reflects the productivity of capital. The entrepreneur has reason to expect that his enterprise will yield economic interest because his capital if invested wisely elsewhere would do so. Business accounting, however, usually includes economic interest as part of profits.

Some conservation projects require expenditures for resource development over a period of years in order that substantial and sustained returns will flow from them. During these years little or no income may be received. For such projects the future expected rate of return should be estimated. To do this it would be first necessary to estimate the total future investment at the time when sustained maximum returns could be expected. The future investment would consist of the present investment carried forward at the pure interest rate plus net annual operating deficits with interest to the same point in time. The future rate of return would then equal the sustained annual net return divided by the future investment (on the assumption that the future investment and returns would represent averages for an indefinite period). In the process of forecasting future returns it would be necessary, of course, to make a reasonable allowance because of the physical, economic and perhaps political elements or risks which ordinarily cannot be foreseen and which would adversely affect the returns.

Conservation projects have received large sums of money and supplies of labor which were not fully chargeable to the projects because of their relief character. However, justification exists for debiting part of such costs to the projects. Possibly the cost of doing the work with efficient labor could be charged to the projects, the remainder to be charged to relief.

Overhead charges incurred elsewhere than on the project, such as regional and central headquarters overhead, might be apportioned to the projects on some reasonable basis such as each project's current appropriation.

An item of cost which also needs brief mention is the payment of contributions in lieu of taxes. Such contributions on conservation lands are now paid to states or local rural governments on a percentage basis from money receipts. These payments, if equal to or less than taxes that would be levied on similar private property of equal value, represent legitimate expense and should be entered as such in the ledger accounts. This would be equally true if the payments were made on other than a percentage basis. The conclusion

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If profits exceed economic interest the excess represents a reward for managerial foresight and risk bearing. This excess is what economists prefer to call true profit. The accounting system proposed in this article takes the economist's position and consequently economic interest is considered, for accounting purposes, as cost rather than profit. Long-term government loans carry an interest charge roughly equal to the pure interest rate as defined in the text above.

is inescapable that "The tax item is a 'true' cost, and allowance must be made for it in over-all social accounting if governmental investments are to be made in conformity with rational economic calculations, and if the charge is to be avoided that the government is in 'unfair competition' with private enterprise."[9]

The end product of an economic accounting system for each conservation project would be the net return per dollar of investment. Once this were approximated it would become possible to answer the question—How much public money should be spent on conservation projects?—with more precision than existing rule-of-thumb methods permit. It would be possible to compare this net rate of return for each conservation project with the average net rate of return existing in the universe of private business, considered as equivalent to the pure interest rate.

From the standpoint of national planning which should be based on the policy of maximum benefit to the national economy (from both public and private sources), it seems logical and proper to use the pure interest rate as our basic criterion and yardstick for the wise expenditure of public money in conservation.

It is recognized, however, that private enterprise too produces returns to society which ordinarily would not be involved in the price structure. Certain types, such as those engaged in sustained yield forestry, produce returns a substantial proportion of which are in this class. "In such cases, it may be economical for organized society to subsidize private enterprises in order to obtain a larger amount of social products which are joined with a certain kind and volume of private production and which otherwise would be supplied in smaller quantities or not at all."[10]

Consideration of social returns from private enterprise would require, concomitantly, estimation of social costs which do not impinge upon the individual but are borne by society. The relief burden imposed upon the public by stranded populations in the Lake States cutover region is an example. Thus some existing private industries are more or less exploitive in character, they exist and profit by depleting resources which under a good form of management are economically capable of being saved, renewed and made permanent. The productive capacity of the land may be

[9] R. W. Nelson, "Controlled burning, etc." Op. cit., p. 816.

[10] S. Von Ciriacy-Wantrup, Land conservation and social planning. Plan Age, Jour. of the National Economic and Social Planning Assn., April 1939.

destroyed or seriously depleted. Such industries, whether by choice or by force of economic circumstances, are temporary rather than permanent. The people dependent thereon must obtain their livelihood elsewhere (which may be difficult) or must seek public financial assistance. The sum of these and similar forms of cost to society if balanced against the total unpriced social benefits from private industry conceivably might cancel. (Also, the aspect of social cost is subject to control. Private enterprises which produce high net social costs are or should be susceptible to public regulation or public ownership and operation.) For lack of existing tangible evidence on the subject this assumption might be made at the outset. It should be recognized, however, that this problem represents a relatively unexplored field and one to which special study should be given.[11]

The basis for our comparison between public and private returns, at least until special studies have shown the need for modification, would be for private enterprise the sum of all dollar returns expressed as a rate on the total invested capital (this rate here being considered as approximately equal to the pure interest rate) and for public enterprises the sum of cash dollar returns plus the sum of the estimated dollar values of the non-monetary returns expressed as a rate on the total invested capital. In the latter, this rate would consist of two parts, one easy of determination, the second much more difficult requiring dialectical treatment from the economic viewpoint.

In general and over a reasonable period of time, if a conservation project will not yield the average net rate of return expected of private business, considered as equal to the pure interest rate, it may be better in order to maximize the national wealth and income to (a) leave in private hands the funds that would be used to run such a public enterprise, or (b) transfer appropriations from such projects to those yielding at least the average net rate of return expected of private business.

With respect to (a) it would be necessary to consider the effects of the expenditures of public money on the national economy as contrasted with the effects on the national economy if such money were left in private hands. This thought is well expressed in Vermont's constitution which provides that "previous to any law

[11] For an interesting discussion of exploitation and social costs see Arthur C. Bunce. Op. cit., pp. 539–543.

being made to raise a tax, the purpose for which it is to be raised ought to appear evident to the legislature to be of more service to the community than the money would be if not collected" (Art. 9, Ch. 1). Obviously, if the net rate of return from public conservation projects exceeds that from private enterprise and there is reasonable expectation of its doing so in the future, there exists a strong argument for increasing public expenditures for conservation, particularly if private enterprise will not or cannot expeditiously take over expansion of conservation activities.[12] If, in the future, the public rate of return permanently decreases until equal to the private rate, the expenditures should be held stationary; if it drops below, they should be decreased by eliminating the least productive expenditures until the net rate of return would become equal to the private rate, the amount of the decrease being left either in private hands for investment or transferred to the "best-paying" conservation projects.[13]

With respect to (b) above, consider the following: A privately owned parent corporation, having a number of subsidiaries, prepares annual financial statements showing consolidated profit or loss, assets, current liabilities, capital stock and surplus for itself and its subsidiaries. The parent corporation is vitally interested in the financial success of each one of its subsidiaries because of the effect of each on the total profits of the corporation. In like manner, for example, we may think of each one of the 160 national forests in the national forest system as a "subsidiary corporation" similarly responsible for the production of maximum net returns per investment dollar. Each has an important effect on the aggregate returns of the parent corporation—the national forest system. It is in this connection that the foregoing conservation accounting methods also may be of much importance. They would show on a compara-

[12] Diminishing returns would apply, of course, to the increases in expenditures here suggested. The increases should not go beyond the point where the last dollar of expenditure would result in a net rate of return equal to the pure interest rate. Aggregate net returns would thereby be maximized. Also, of course, the need for increased expenditures for conservation would have to be compared with the needs of other governmental activities on the basis of equating the marginal returns from each.

[13] It is possible that for some conservation projects the investment has been built up so greatly that even though expenditures were reduced to a bare minimum the net rate of return would never equal the pure interest rate. In case of such projects the question would relate to productivity of further expenditures; future outlays should be limited to amounts on which the projects will earn economic interest, recognizing that a loss has been sustained in the existing investment. The amount of loss would be the difference between the existing and the recapitalized investment.

tive basis the national forests that were producing or that promised to produce the maximum net returns. The distribution of available funds among the national forests so as to maximize the aggregate returns of the national forest system would then be easier of accomplishment than at present. Those national forests which held out the promise of the largest rate of return per investment dollar could be considered eligible for the largest appropriations. The same principle would hold true for grazing districts, national parks, and other conservation projects. By comparing projects having high rates of return with those having low rates, light might be thrown on causes of and remedies for the differences.

The approach to realism in analyzing our current and proposed conservation expenditures suggested in this article has as its objective the measurement of the success of our conservation projects in terms of their effect on the national economy. It should serve to answer the question of the economic justification for these expenditures more satisfactorily than existing procedures and should, therefore, indicate more clearly the nature and extent of the contributions of conservation projects to the national economy. Maximum social welfare is, of course, the ultimate goal. Without attempting to maximize the national economy, however, we cannot expect to attain the highest possible level of social welfare. The former is fundamental to the latter.

Reference has been made to the current unprecedented strain on the Federal treasury caused by the war. Appropriation of money for this purpose is, of course, of paramount importance and secondary needs must be relegated to the background. When nations are at war, so-called normal economic processes undergo drastic and far-reaching change. An evaluation of the sort here suggested becomes more difficult because of this curb on the free action of economic laws and because extraneous factors occasioned by the war are superimposed. With respect to conservation projects the fundamental concept based on costs, returns and the pure interest rate as previously outlined must be broadened to include an evaluation of their direct and indirect contributions to the war effort. Because the net favorable results of the war activity cannot be measured in dollar terms, this evaluation must be on a qualitative basis. The prosecution of the war by this country to safeguard our people, wealth and institutions will mean, even though we are successful, a net decrease in our total wealth and real income for the

time being. Undoubtedly, however, the costs and returns analysis suggested would contribute substantially to a clearer understanding and recogntion of the importance of conservation projects to the war effort. It would aid Congress and the public to judge better the appropriate place of conservation projects in the realm of Federal fiscal policy under war conditions.

In conclusion it should be emphasized that this discussion of public expenditures for conservation is essentially an attempt to present a foundation of economic logic. The methodology has been discussed only to the extent necessary to clarify the "philosophical" implications of this position. The development of additional principles and of evaluation techniques is the next step, and no one will minimize the complexity of the problems here involved. Before embarking on the development of methodology, however, the logical consistency and correctness of the underlying theory should be demonstrated and accepted. A liberal outlook on divergent views must be assumed, therefore, so that the concepts finally promulgated may be as free from bias and irrationalism as possible.

AN ANCIENT EXPERIENCE WITH PRICE CONTROL

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ONE of the characteristic features of the present economic situation in the United States and in other countries at war is an increased effectual demand coupled with decreasing quantities of goods brought to market. Both factors have arisen out of the war situation. The market is becoming more and more an emergency market and the prices based on it are in part no longer normal prices. The law of supply and demand, regulating the actual price of goods, is weakened in its function, not only because of the growing scarcity of goods, but also as a result of greater purchasing power. This "increasing purchasing power" as states the introduction to the Canadian *Maximum Prices Regulations* of November, 1941, "will, if unchecked, create undesirable inflation of prices." As one means of checking inflation Great Britain, Canada, the United States, and other countries have resorted to price control, using predominantly the method of either uniform or individual maximum price fixing. Yet maximum prices are not new, as ancient economic history shows.

In 301 A.D. the Roman Emperor Gaius Aurelius Valerius Diocletianus promulgated his famous edict *De pretiis rerum venalium*, which fixed a maximum price for more than one thousand items.

The edict was published in the form of an imperial law. It was enacted by Diocletian himself, by his consort Maximianus, to whom Diocletian had transferred his authority over the Western Empire, and by the two Caesars, Constantius and Galerius, whom the two emperors had adopted as their aids in the government and as their potential successors. The question has arisen whether the edict was published and enforced in the whole empire, or whether it applied to the East only, the part of the empire ruled by Diocletian himself. The introduction (*praefatio*) to the edict provides that the maximum prices "be held in observance throughout our whole domain (*totius orbis nostri observantia contineri*)" and emphasizes in its last paragraph that "by such a statute provision is manifestly made not only for the individual states (*civitatibus singulis*) and peoples and provinces but for the whole empire (*universo orbi*)." This seems to indicate that the edict was not intended for the Eastern

provinces only, as M. Rostovtzeff and others assume,[1] but for the whole Roman Empire. Yet it remains doubtful whether the edict was published in other parts of the empire than in the East. The complete text of the edict has not been found; only fragments are known, all of them discovered in Egypt, Asia Minor, and Greece, that is, in the part of the empire ruled by Diocletian in person. Specific mention of the edict is found only in a treatise attributed to Lactantius and published in Asia Minor. Despite the fact that most of the fragments picked up in various places were written in Greek, there is no doubt that the original document was in Latin. The Greek texts were translations interspersed with many language errors.

The first masterly reconstruction of the edict was made by Theodor Mommsen, and his reconstructed text was edited by Hugo Blümner, who added a very careful commentary. The edict was arranged with titles heading the various sections, the title showing often only the first item of a section. Within some of the sections the different items showed no connection with each other: dyes and needles, for instance, are placed together; feathers and fillings for upholstery are placed with writing materials in another section. H. Blümner[2] put together 32 sections with titles, translated from Blümner's German, as follows:

1. Field produce and seeds.
2. Wine and other beverages.
3. Oil, vinegar and other ingredients used in the preparation of food.
4. Meat, poultry, game and fats.
5. River fish and sea food.
6. Garden and farm produce.
7. Wages for farm laborers, artisans, teachers and others.
8. Skins and furs.
9. Shoemakers' tools and shoes.
10. Saddles and harness.
11. Goat hair and camel hair, and manufactured goods made from them.
12. Building timber.
13. Turned articles.
14. Wooden posts and firewood.
15. Timber for wagons, finished wagons, agricultural implements, mills, sieves.
16. Dyes.—Needles.
17. Carters' wages.—Fodder.

[1] See M. Rostovtzeff. A history of the ancient world, Volume II, Rome. Oxford 1928, p. 302; Roland G. Kent. "The Edict of Diocletian fixing maximum prices." University of Pennsylvania Law Review, Volume 69, 1921, p. 40. H. Blümner. Der Maximaltarif des Diocletian. Berlin, 1893, p. 54.

[2] H. Blümner, *ibid.*, pp. 61–181.

18. Feathers and fillings for upholstery.—Writing materials.
19. Robes and cloths of wool and silk.
20. Wages for embroiderers, silk weavers and female wool weavers.
21. Wages for male wool and linen weavers.
22. Wages for fullers.
23. Raw silk and silk thread.
24. Purple silk and purple wool.
25. Sheep wool and other wool.
26. Linen thread and linen goods.
27. Linen goods (continued).
28. " " "
29. " " (concluded).
30. Gold and gold articles (wages for goldsmiths).
31. Silverware.
32. Various articles.

The prices for all the items within these sections were fixed by the edict as uniform maximum prices, expressed in denarii, and ranging from 2 to 150,000 denarii. The edict is not concerned with wholesale prices, and the maximum prices throughout are those charged to the consumer. In scope the edict is unique, for it represents the first and only recorded, all-embracing system of price control in the history of Rome.

Looking into the significance of the edict and into the causes for its promulgation, it is fair to consider first the justification presented by Diocletian in the *praefatio* to his measure. The *praefatio*, of which we possess the original Latin text, has been described as "one of the most extraordinary pieces of bombast, mixed metaphors, loose syntax, and incoherent expressions that Latin literature possesses."[3] It is true that the sometimes bombastic, poetical language of the *praefatio* tends to be pompous and moralizing. Today Diocletian would perhaps be called a fascist dictator, a totalitarian despot, and his *praefatio* a masterpiece of propaganda, calculated to shift the responsibility for a rise in prices. Yet the *praefatio* is one of the very few sources of information on the importance of the edict and the reasons for its proclamation. It attempts not only to justify the promulgation of the edict, but is apparently also an integral part of it as it contains the legal penalties for infringement.

Translations[4] exist in English as well as in German. The following

[3] Frank Frost Abbott. The common people of ancient Rome. New York 1911, pp. 153, 154. See also H. Blümner, op. cit., p. 55; Karl Bücher "Die Diokletianische Taxordnung vom Jahre 301." Zeitschrift für die gesamte Staatswissenschaft, 50. Jahrgang. Tübingen 1844, p. 191; Roland G. Kent, op. cit., p. 40.

[4] For English translations see: Papers of the American school of classical studies

is the translation by Roland G. Kent.[5] I have made a few verbal changes and have set in brackets the original Latin words where I thought the correct translation was difficult or doubtful. Roland G. Kent has arranged the text of the *praefatio* in paragraphs of one sentence each. The preamble mentioning only the two Augusti and the two Caesars is not translated. Apart from this the *praefatio* reads in translation as follows:

"1. The national honor and the dignity and majesty of Rome demand that the fortune of our State—to which, next to the immortal gods, we may, in memory of the wars which we have successfully waged, return thanks for the tranquil and profoundly quiet condition of the world—be also faithfully administered and duly endowed with the blessings of that peace for which we have laboriously striven; to the end that we, who under the gracious favor of the gods have repressed the furious depredations, in the past, of barbarous tribes by the destructions of those nations themselves, may for all time gird with the bulwarks due to justice the peace which has been established.

"2. To be sure, if any spirit of self-restraint were holding in check those practices by which the raging and boundless avarice is inflamed, an avarice which, without regard for the human race, not yearly or monthly or daily only, but almost every hour and even every moment, hastens toward its own development and increase; or if the common fortunes could with calmness bear this orgy of license, by which, under their unhappy star, they are from day to day ripped to pieces—peradventure there would seem to be room left for shutting our eyes and holding our peace, since the united endurance of men's minds would ameliorate this detestable enormity and pitiable condition.

"3. But since it is the sole desire of untamed fury to feel no love for the ties of our common humanity; and since among the wicked and lawless it is held to be, so to speak, the religious duty of an avarice that swells and grows with fierce flames, that, in harrying the fortunes of all, it should desist of necessity rather than voluntarily; and since those whom extreme poverty has brought to a perception of their most wretched condition cannot further keep their eyes shut; it suits us, who are the watchful parents of the whole human race, that justice step in as an arbiter in the case, in order that the long-hoped-for result, which humanity could not achieve by itself, may, by the remedies which our fore-thought suggests, be contributed toward the general alleviation of all.

"4. And of this matter, it is true, as the common knowledge of all recognizes and indisputable facts proclaim, the consideration is almost too late, since we form plans or delay discovered remedies in the hope that, as was

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of Athens, V (1892); pp. 233–244; Frank Frost Abbott, op. cit., pp. 154 ff. (only parts of the *praefatio* are translated there); Roland G. Kent, op. cit., pp. 41–44. For a German translation see Karl Bücher, op. cit., pp. 699–701.

[5] Roland G. Kent, op. cit., pp. 41–44. The editors of University of Pennsylvania Law Review were kind enough to allow me to use the translation.

to be expected from natural justice, humanity, detected in most odious crimes, might work out its own reformation; for we thought it far better that the censure of intolerable robbery should be removed from the court of public opinion by the feeling and decision of those men themselves, who rush daily from bad to worse and in a sort of blindness of mind tend toward outrages upon society, and whom their grave misdoing has branded as enemies alike to individuals and to the community, and guilty of the most atrocious inhumanity.

"5. Therefore we proceed promptly to apply the remedies long demanded by the necessity of the case, and that too, feeling no concern about complaints that our corrective interference may, as coming unseasonably or unnecessarily, be considered cheaper or less valuable even in the eyes of the wicked, who, though seeing in our silence of so many years a lesson in self-restraint, nevertheless refused to follow it.

"6. For who has so dull a breast, or is so alien to the feeling of humanity, that he can be ignorant, nay rather has not actually observed that in commodities which are bought and sold in markets or handled in the daily trade of cities, the wantonness in prices had progressed to such a point that the unbridled lust of plunder (*effrenata libido rapiendi*) might be moderated neither by abundant supplies nor by fruitful seasons?

"7. So that there is clearly no doubt that men of this sort, whom these occupations have engaged, are always mentally calculating and even seeking, from the motions of the stars, to take advantage of the very winds and seasons, and by reason of their wickedness cannot bear that the fields be watered and made productive by the rains of heaven, so as to give hope of future crops, since they consider it a personal loss for abundance to come to the world by the favorable moods of the sky itself.

"8. And to the avarice of those who are always eager to turn to their own profit even the blessings of the gods, and to check the tide of general prosperity, and again in an unproductive year to haggle about the sowing of the seed and the business of retail dealers; who, individually possessed of immense fortunes which might have enriched whole peoples to their heart's content, seek private gain and are bent upon ruinous percentages of profit—to their avarice, ye men of our provinces, regard for common humanity impels us to set a limit.

"9. But now, further, we must set forth the reasons themselves, whose urgency has at last compelled us to discard our too long protracted patience, in order that—although an avarice which runs riot through the whole world (*toto orbi*) can with difficulty be laid bare by a specific proof, or rather fact—none the less the nature of our remedy may be known to be more just, when utterly lawless men shall be forced to recognize under a definite name and description, the unbridled lusts of their minds.

"10. Who therefore can be ignorant that an audacity that plots against the good of society is presenting itself with a spirit of profiteering, wherever the general welfare requires our armies to be directed, not only in villages and towns, but along every highway? That it forces up the prices of commodities not four-fold or eight-fold, but to such a degree that human language cannot find words to set a proper evaluation upon their action?

Finally, that sometimes by the outlay upon a single article the soldier is robbed both of his bounty and of his pay, and that the entire contributions of the whole world (*totius orbis*) for maintaining the armies accrue to the detestable gains of plunderers, so that our soldiers seem to yield the entire fruit of their military career, and the labors of their entire term of service, to these profiteers in everything, in order that the plunderers of the commonwealth may from day to day carry off all that they resolve to have?

"11. Being justly and duly moved by all these considerations above included, since already humanity itself seemed to be praying for release, we resolved, not that the prices of commodities should be fixed—for it is not thought just that this be done, since sometimes very many provinces exult in the good fortune of the low prices which they desire, and as it were in a certain privileged state of abundance—but that a maximum be fixed; in order that, when any stress of scarcity made its appearance (*cum vis aliqua caritatis emergeret*)—which omen we prayed the gods might avert—avarice, which could not be checked on the so-to-speak endlessly extending plains might be confined by the bounds of our statute and the limits set in the law promulgated to control them.

"12. It is our pleasure, therefore, that those prices, which the concise items of the following list indicate, be held in attention throughout our whole domain, in such a way that all men understand that freedom to exceed them is removed; while at the same time, in those places where goods manifestly abound, the happy condition of cheap prices shall not thereby be hampered—and ample provision is made for cheapness, if avarice is limited and curbed.

"13. Between sellers, moreover, and buyers whose custom it is to enter trading-posts and visit provinces overseas, this restraint will have to be a mutual action, that, while they already of themselves know that in the need imposed by scarcity (*in caritatis necessitate*) the price-limits cannot be exceeded, at the time of retailing such a reckoning of places and bargainings and of the whole transaction be figured out, that under it there is manifestly a fair agreement that those who transport the goods shall nowhere sell at an unduly high price.

"14. Because, therefore, it is an established fact that among our ancestors also the method employed in new enactments was that boldness be curbed by a prescribed penalty—since very rarely is a status found for men which will benefit them with their free consent, but it is always fear, justest teacher of duties, which will restrain and guide them in the right path—it is our pleasure that if anyone have acted with boldness against the letter of this statute, he shall put his life in peril (*capitali periculo subiugetur*).

"15. And let none think that a hard penalty is set, though when the time comes the observance of moderation will be a refuge for averting the peril.

"16. He also shall be subject to the same peril, who drawn along by avarice in his eagerness to buy, shall have conspired against these statutes.

"17. From such guilt also he too shall not be considered free, who, having goods necessary for food or usage, shall after this regulation have thought that they might be withdrawn from the market; since the penalty

ought to be even heavier for him who causes need than for him who makes use of it contrary to the statutes.

"18. We therefore appeal to the devotion of all, that the decision made for the public welfare be observed with generous obedience and due scrupulousness, especially since by such a statute provision is manifestly made not only for the individual states and people and provinces, but for the whole empire (*universo orbi*), for whose ruin a few, we learn, have raged exceedingly, whose avarice neither length of time nor the riches which they are seen to have desired, have been able to moderate or satisfy."

The *praefatio* shows in terms of florid hyperbole how the vices of avarice and usurious dealing, and the unbridled lust of plunder are to be held responsible for the high cost of living, particularly in those parts of the empire in which the imperial armies were stationed. A suitable title for the *praefatio* would be "A condemnation of Avarice."

It will be admitted that avarice, or as it would be described today, the desire for as large a profit as possible, is an important factor in the formation of prices for goods and services, and that this factor tends to raise prices when demand exceeds supply. This remains true both when the scarcity of goods can be traced to natural causes, whose existence the introduction of Diocletian's edict seems to deny, and when the scarcity has been produced artificially, as the *praefatio* maintains. Yet the desire for unduly high profits is not sufficient explanation for so comprehensive a measure of price regulation. It is unthinkable that avarice should have played the one decisive part in the formation of prices for the very long list—more than one thousand items—enumerated by Diocletian. The *praefatio*, in its violent condemnation of avarice, refers only to the high price of goods, and makes no mention of wages and remuneration for services. The edict, on the contrary, extends the regulation of prices beyond goods to wages for such workers as farm laborers, masons, carpenters, joiners, lime-burners, etc.; and to tariffs for such services as metal-working, tailoring, writing, teaching. It is perhaps significant that the different workers are not accused of avarice.

Beyond the *praefatio* there is little in Roman literary sources to offer enlightenment on the edict. In *De Mortibus Persecutorum* (On the Death of Those Who Persecuted), the one treatise in which explicit mention of the edict is made, the author, possibly Lactantius, writes as follows:[6] "And when he had brought on a state

[6] Translation by Frank Frost Abbott, op. cit., p. 177.

of exceeding high prices by his different acts of injustice, he tried to fix by law the prices of articles offered for sale. Thereupon, for the veriest trifles much blood was shed, and out of fear nothing was offered for sale, and the scarcity grew much worse, until, after the death of many persons, the law was repealed from mere necessity."

As the title of the treatise suggests, Lactantius, or whoever the author was, can have had little love for Diocletian, under whose rule the Christians suffered such cruel persecution. Yet it is likely that a "state of exceeding high prices" actually preceded the edict and was perhaps the immediate occasion for its promulgation. The *praefatio* itself admits this fact. Lactantius is equally trustworthy when he states that the edict was a failure; the edict was repealed not later than May 1, 305, the date of Diocletian's abdication. As to Diocletian's responsibility for the "state of exceeding high prices," Lactantius offers no explanation of his indictment, and does not even say with what "different acts of injustice"[7] Diocletian had promoted the rise in prices. Discussing the probable meaning of Lactantius' accusation Hugo Blümner and others[8] suggest measures which include: the greatly increased size of the army, the creation of numerous new offices and posts, the increase of taxes, Diocletian's avarice and his expensive buildings. The commentators on the edict mention other circumstances which, apart from Lactantius' opinion, were responsible for the rise in prices, the potential immediate occasion for the promulgation of the edict. They think that the rapid debasement of the coinage followed by the disappearance of all silver from the market, together with the mintage of vast quantities of inferior copper coins was the main cause for the rapid increase in prices.

As for the army, it is true that it was increased on a large scale. The author of *De Mortibus Persecutorum* says that the size of the combined armed forces was quadrupled. As the Christian writer of the book was prejudiced against Diocletian his statement is probably an exaggeration. But the army was at least doubled or even tripled. Likewise "the number of ministers, of magistrates, of officers and of servants who filled different departments of the

[7] Roland G. Kent, op. cit., p. 39, in "by his varied unreasonable tax-levies" would seem to make too liberal a translation of *cum variis iniquitatibus*.

[8] H. Blümner, op. cit., p. 53, Karl Bücher, op. cit., p. 193, M. Rostovtzeff, op. cit. p. 317; M. Rostovtzeff, The social and economic history of the Roman Empire. Oxford 1926, p. 417.

state was multiplied beyond the example of former times." The author of *De Mortibus Persecutorum* goes so far as to state[9] that "the proportion of those who received exceeded the proportion of those who contributed." The consequence was, according to him, that the "provinces were oppressed by the weight of tributes." This leads to the important question of taxation.

The third century witnessed the social and economic decline of the Roman Empire.[10] The turning point was probably the death of Marcus Aurelius, the last "enlightened" despot. Under the rule of his son Commodus, 180–192, the army and its leaders increased their power and became finally the relentless masters of the state. After the violent death of Commodus civil war broke out, and the death of Severus Alexander in 235 was followed by the rule of a plundering, murdering soldiery, feared and hated by the whole population. But the emperors were dependent on the army which proclaimed and disposed of them, often after a very brief rule. There were twenty-six Roman emperors between 235 A.D. and 285 A.D. Only one of them died a natural death. These so-called "soldier emperors," relying solely upon the military forces, needed above all money for the army, and they apparently took to heart the admonition of the dying Septimius to his sons, "Enrich the soldiers. Trouble about nothing else." To achieve this end they increased the taxes, and more especially the taxes on landowners. In addition to the regular taxes paid in money, the emperors levied an extremely burdensome additional tax (*annona*) which was paid in kind. This extraordinary and irregular tax took the form of deliveries to the state of all kinds of food supplies, such as grain, legumes, oil and meat, of raw material, such as wood, iron, and building material, and of manufactured goods, such as cloth, linen, and articles of dress for soldiers. When the emperors increased their demands for deliveries and other tax payments, including compulsory gifts extorted from individuals and cities, beyond the taxable capacity of the people, trade and industry fell into disorganization, the general productivity of the empire was reduced, and land was left uncultivated. There is evidence that this development was particularly serious in Asia Minor and Egypt. Landowners unable to pay the taxes were deprived of their land, which rapidly ran to

[9] E. Gibbon, The history of the decline and fall of the Roman Empire, I, 440

[10] For further information see: M. Rostovtzeff's books: The social and economic history of the Roman Empire, pp. 417–478; A history of the ancient world, Volume II, Rome, pp. 305–333.

waste for want of people willing to undertake cultivation in view of the oppressive taxation. As M. Rostovtzeff[11] states, irrigation and drainage works were neglected, leading to still further reduction of the land under cultivation, and worse, to the frequent occurrence of famines and the spread of malaria.

It is self-evident that over-taxation, serious though it was, was not alone responsible for this decay. But it is true that the system of taxation, having degenerated into "organized robbery" constituted one of the main causes of the social decline of the Roman Empire during the third century. Diocletian came to the throne in 284 A.D. to take over a thankless heritage. Had he been a creative organizer, a constructive reformer, he might have done much to check the processes of decay in the empire. But he made no effort to remove the abuses of the third century. Instead of cancelling the arbitrary and extraordinary measures and restoring a fair and individual system of taxation, Diocletian legalized and made permanent taxes which had been exceptional in the third century, especially the *annona*, thus organizing to a still greater degree the robbery of his predecessors. In the interests of the state, as opposed to those of the people, Diocletian over-simplified the machinery of taxation, introducing a system of collective responsibility for the payment of taxes. The result was an attempt on the part of individuals, already ruined by excessive taxation, to evade their responsibility; the peasants moved from place to place; the landowners, responsible for dues which they were unable to collect from their peasants, tended to give up their land and allow it to go to waste. To check this tendency the government forced the peasants to stay on the land, and the middle classes to remain in their own towns in order to shoulder the responsibility for the taxes. But such measures, adding intolerable compulsion to the already oppressive burden of taxation, and reducing large numbers of the populace to the level of serfs, were not likely to restore prosperity or even tolerable conditions for the people.

It is clear then that Diocletian, by his so-called reforms, and particularly by his pernicious system of taxation, brought further disruption to a state already disorganized through the policies of his predecessors. But Diocletian's mistakes, even together with the vastly increased army and civil service, still offer no sufficient ex-

[11] M. Rostovtzeff, The social and economic history of the Roman Empire, pp. 424, 425.

planation for the promulgation of the edict *De pretiis rerum venalium*, or for its failure, and it is therefore necessary to examine the importance of the debasement of the coinage and of the greatly increased circulation of inferior copper coins.

It is fairly well proved that Diocletian was not interested in the welfare of the people. He did not hesitate to sacrifice the individual to the end of preserving the empire and of maintaining his own autocratic power. But he was dependent on the army, and to that extent, as the *praefatio* shows, he wished to satisfy the soldiers. Karl Bücher[12] comes to the conclusion that in this respect the emperor was worried by the universal debasement of the coinage, and that he promulgated the edict in an attempt to fix the relation between marketable goods and the debased currency by means of a governmental dictate. The edict, in Karl Bücher's opinion, represents a manipulation of the currency with the secondary purpose of improving conditions in the army by putting the soldier again in a position to obtain value for his pay.

To appreciate this point of view it is necessary to investigate the history of the Roman currency.[13] In the time of Sulla (81–78 B.C.) the Roman state began to coin in gold, and by the time of Julius Caesar the so-called *aureus* had become the regular gold coin. The original weight of the *aureus* was fixed by Caesar at 1/40 of a Roman pound (327.45 grams). After Caesar's death this weight was steadily reduced until in the middle of the third century A.D. gold coins were minted in such irregular weights that their value was assessed by weight alone. Stabilization, attempted under Diocletian, was not achieved until the reign of Constantine, probably in 312 A.D.

The first Roman silver coins were minted about the time of the First Punic War, according to Pliny, in 269 B.C., according to Livy, a year later. The unit was the *denarius*, with the smaller denominations *quinarius* and *sestertius*. The weight of the denarius was originally 1/72 of a Roman pound, the equivalent of 4.55 grams. This weight however was soon reduced, probably in 254 B.C., to 1/84 of a pound, or 3.9 grams. Greek and Roman writers identified the denarius with the Attic (Alexander) drachma, and it

[12] Karl Bücher, op. cit., pp. 193 ff.

[13] For the following see: Friedrich Hultsch. Griechische und Römische Metrologie. Berlin 1882, pp. 254–348; Karl Bücher, op. cit., pp. 193–195. M. Rostovtzeff, A history of the ancient world, II, 50, 152. M. Rostovtzeff, The social and economic history of the Roman Empire, pp. 417–419, 463. H. Blümner, op. cit., pp. 53, 58–59.

was probably the intention of the Romans to assimilate their new silver coin to the older drachma, which after Alexander weighed about 4 grams. The denarius apparently remained stable at the 3.9 gram level for more than 300 years. Under Nero, probably in 60 A.D., the weight of the denarius was fixed at 1/96 of a pound. At the same time the silver was replaced by an alloy of silver and copper, between 5 and 10 per cent at first, but later increased to between 50 and 60 per cent. Under Caracalla, after 215 A.D., a new silver coin, *Antoninianus*, was minted, but very soon regularly and progressively adulterated until it lost all value.

By the time of Diocletian the denarius, the unit of value in which all the prices of the edict were expressed, was a copper coin. Its value as fixed by the edict is indicated on a fragment of the edict discovered in Elatea in Phokis. In the section περὶ χρυσοῦ of this fragment (section 30 of the edict as recontructed by Th. Mommsen and commented on by H. Blümner) the maximum price of one Roman pound of pure gold is set at 50,000 denarii. H. Blümner[14] and Karl Bücher evaluate the denarius of the edict at 1.827 *Pfennige* based on the price of 918.59 *Mark* for one Roman pound of pure gold. The value of 1.827 *Pfennige* is equivalent to .435 cent[14] of United States currency before the devaluation of the dollar in 1934, or about .737 cent of present U. S. currency. According to the generally accepted[15] evaluation, the stabilized silver denarius of the Republic was worth approximately 17 cents of United States currency before the devaluation of the dollar. 17 cents of United States currency before 1934 are equal to 28 cents of present currency.

Under Diocletian the copper denarius had become the unit of currency. There was nothing in circulation which could be called

[14] Frank Frost Abbott, op. cit., p. 168, calculated the value of the copper denarius at .4352 cent, and Roland G. Kent, op. cit., p. 45, at .434 cent (before the devaluation of the dollar). One dollar before 1934 contained 23.22 grains or 15.046 grams of pure gold. This fixes the value of the copper denarius at .4352 cent. The present gold dollar contains 13.71 grains or 8.88408 grams of pure gold. This ratio fixes the value of the copper denarius at .737 cent of the present currency. We are here concerned not so much with the actual value of the denarius as with the ratio between the original silver denarius and the copper denarius of Diocletian.

[15] One silver dollar before 1934 was equivalent to 371.25 grains of pure silver and one silver denarius of the weight of 3.9 grams was equivalent to 60.1848 grains (1 gram = 15.432 grains) of pure silver or to about 16.4 cents. According to The Encyclopaedia Americana, 1940, VIII, 674, one denarius was equivalent to about 16 or 17 cents and according to The New International Encyclopaedia, 1909, VI, 423, to about 17 cents. Karl Bücher, op. cit., p. 193 and Friedrich Hultsch, op. cit., pp. 298, 299 evaluate the silver denarius (after 254 B.C.) at 70 Pfennige, equivalent to about 17 cents of United States currency before 1934.

money except the copper denarius. This small change had become the exclusive legal tender, the only coin still assessed at face value, in contradistinction to the gold and silver coins which, so far as they had not disappeared completely from the market,[16] were assessed by weight[17] alone. Together with this fact it is significant that the denarius had fallen from a value of about 28 cents (present currency) to one of about .737 cent, or, in other words, had depreciated approximately 97.4 per cent.

Applying these facts to the edict Karl Bücher[18] concludes that the edict contains rather the establishment of a tariff for money in terms of commodities than of a tariff for commodities in terms of money. In other words, *the edict does not fix maximum prices for goods, but minimum values for the debased currency.* This may only be two ways of looking at the same object, one from the viewpoint of commodities, the other from the viewpoint of prices, yet it enables a clearer view of the whole measure.

Underlying the edict is not only the debasement of the currency as stated by Karl Bücher, but also the reason for this debasement, the continual increase in the amount of money coined in the third century, especially in the latter half of this period. The sole recognizable reason why the existing stocks of gold and silver were insufficient to maintain the stability of the coinage is the constant increase in the number of coins, made possible only by a reduction of the amount of gold and silver employed. In their perpetual need for more and more money the emperors, having almost exhausted the taxable capacity of the people, issued a vast quantity of coin with which to satisfy their creditors. In the absence of adequate gold and silver supplies the government mint in the third century consequently[19] "became a vast manufactory of base coin." It is an interesting point that from the time probably of Elagabalus (222 A.D.) the state often refused to accept its own fiduciary money in payment of taxes.

Considering on the one hand that the copper denarius had depreciated about 97.4 per cent as compared with the silver denarius, and on the other hand, that the quantity of debased money had continually increased, the conclusion must be drawn that actually

[16] H. Blümner, op. cit., p. 53. According to Gresham's law it is likely that the base copper money had driven the more valuable coins out of circulation.
[17] Karl Bücher, op. cit., pp. 193, 194; Friedrich Hultsch, op. cit., pp. 326, 329.
[18] Karl Bücher, op. cit., p. 197.
[19] M. Rostovtzeff. A history of the ancient world, II, 317.

the edict was promulgated as a result of *an extreme money inflation*.

Karl Bücher[20] stresses the point that all prices fixed by the edict, even the very highest, are expressed in denarii, but this gives no evidence on the true nature of the edict. It has already been seen that the denarius represented the only currency in circulation; it was not possible to express prices in other money. More significant is the fact that in contrast to earlier piecemeal legislation, and to a later attempt made by Julian the Apostate in 362 to regulate the price of corn by means of maximum prices, the edict of Diocletian represents a comprehensive measure. Had Diocletian been solely concerned with procuring for the army everyday commodities at reasonable prices, and improbably enough, with meeting the needs of the civil population, he would probably not have devised so unusual and all-embracing a measure as the edict. Maximum price-fixing was by no means unknown at that time; K. Bücher[21] mentions measures passed by Tiberius, Commodus, and Alexander Severus. The increased distribution of bread, oil, and meat among the people under Aurelius (270–275 A.D.) is also not without interest. Aurelius himself is said to have declared wittily that there is "nothing more merry than the Roman people when they have had their fill (*neque enim populo Romano saturo quicquam potest laetitius.*[21])" If, on the other hand, an imperial decree was to regulate the value of the currency, it would have to fix a tariff for every transaction, even for the most unusual, in which an interchange of goods and money took place. The tariff set by Diocletian's edict includes prices ranging from 2 denarii, less than 2 cents of present currency for about half a litre of small beer (*Zythum*), for an ounce of brawn, or for a hair-cut, to 150,000 denarii (more than $1000) for a pound of genuine purple silk.[22] The maximum prices moreover tend to be rounded off and could be described rather as price groups than as individual prices. The uniform maximum price of 4 denarii serves for about 80 items; 50 denarii for over 20 items; 100 denarii for more than 30 items. Among other constantly recurring figures are 60, 75, 100, 250, 300, 350, 400, 500, 600, 1000, 1500, 2000, 3000, and 3500 denarii. Such a system admits the con-

[20] Karl Bücher, op. cit., p. 193.

[21] Karl Bücher, op. cit., p. 195; cf., M. Rostovtzeff, The social and economic history of the Roman Empire, p. 463.

[22] It is not, of course, possible to get an idea of the true market values of goods as they were sold in 301 A.D. by comparing Diocletian's maximum prices (converted into United States currency) with the market prices of today; cf. Karl Bücher, op. cit., pp. 672, 673.

jecture that the prices fixed by decree bear little relation to the actual existing prices. They seem to be artificial and dictated by authority. The *praefatio*, in its attack on the laxity of prices and on the exorbitant prices demanded particularly from the soldiers each time the army was moved to a new place, seems to confirm this conjecture. Moreover, according to the *praefatio*, the prices set by the edict are calculated to meet future emergencies. Paragraph 11 and paragraph 13 of the *praefatio* clearly indicate that even in the case of future scarcity the fixed maximum prices are not to be exceeded. This stresses the point that the edict indeed does not fix maximum[23] prices for goods but minimum values for debased currency.

It remains important that the *praefatio* contains a justification for the regulation of prices for commodities needed by the army and for daily necessities. It gives no explanation for the all-embracing maximum price tariff, and mentions neither services nor wages. There is nothing in either the *praefatio* or the edict itself to show recognition of the economic principle that the fixing of maximum prices for a set of commodities must remain ineffective if other articles, together with services and wages are left uncontrolled. In other words Diocletian was probably not aware that a price system which does not include all prices can in the end control no prices. The only explanation therefore for the edict is to be found in its underlying purpose, which is to stabilize the currency on the basis of the debased copper coinage. The stabilization is to be achieved by fixing a ratio of value between the denarius, the only real unit of money, on the one hand, and commodities, services and wages on the other hand. The realization of the purpose is attempted through an almost complete, though artificial price system, having the outward form of a decree establishing maximum prices, but actually fixing minimum values for the inflated currency. Th. Mommsen[24] describes the edict as a "theoretic swindle." He is certainly right in so far as valuable commodities confronted with debased and inflated money necessarily vanish from the market, as superior money disappears when sufficient inferior money is brought into circulation. Progressive money inflation on the one side and scarcity of goods on the other side lead to a vicious spiral:

[23] As uniform maximum prices usually become the actual prices, Diocletian's emphatically stressed distinction between fixed prices and maximum prices was of no actual importance.

[24] Cf. Karl Bücher, op. cit., p. 193.

Scarcity grows and inflation increases until the currency breaks down completely. The devastating overtaxation and the civil war during the third century make it likely that in some provinces at least there was a considerable scarcity of goods before the promulgation of the edict, and it is certainly true when the author of *De Mortibus Persecutorum* states that after the enactment of the edict "scarcity grew much worse." The inflation, serious enough in 301 A.D., increased too, as is indicated by the progressive devaluation[25] of the denarius. Under Constantine (306–337) the ratio between gold and the denarius was 1:432,000 instead of 1:50,000 as fixed in Diocletian's edict. In other words, within a few years after Diocletian's abdication the same copper denarius in which the maximum prices were expressed had depreciated about 88.5 per cent.

The main reason, therefore, for the failure of the edict is the fact that at the time the edict was enacted, the currency was not only debased but that its devaluation—about 97.4 per cent in 301—had probably already reached a stage which can be described as "runaway." The *praefatio* does not exactly admit this. It refers to raging and boundless avarice, increasing almost every hour and even every moment. Yet the *praefatio* claims that avarice alone is responsible for the increase in prices; and as an augmentation of the source of the evil can be taken to mean an augmentation of the evil itself, prices too must have increased "almost every hour and even every moment." Allowing for the exaggerated language of the *praefatio* it is nevertheless likely that prices and inflation had reached the "runaway" stage.

Diocletian made no attempt to remove the true causes of the rise in prices: the inflation of the currency and the scarcity of goods. He formulated his edict on the thesis that avarice alone, and not the issue of vast quantities of base coin combined with scarcity, was responsible for the crisis. His belief that he as "lord and god" could stabilize an almost totally worthless currency at a probably too high level by his edict alone was a mistake, and the failure of his attempt was inevitable. Yet the edict remains a measure which from the viewpoint of that time represents a unique and grandiose plan for solving a problem, ever recurring in different forms, for which no sure solution has yet been found.

[25] Friedrich Hultsch, op. cit., pp. 338–348.

A METHOD OF DETERMINING FEASIBLE IRRIGATION PAYMENTS

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ONE of the most important questions in the development of irrigation, and often one of the most perplexing, is: Will the farmers be able to pay what the water will cost? Experience has shown that on many irrigation projects they have not been able to do so. Futile attempts of farmers to meet unduly high irrigation payments have resulted in much wasted effort and loss of both public and private invested capital.

Answering this question constitutes a complicated problem in applied production economics. Among elements of the problem that must be considered are physical conditions such as climate, topography, and soil, and the relationships of these conditions to production of crops and livestock. Many costs of production other than irrigation water are involved, some of them very difficult to anticipate accurately. Returns are contingent on price trends, marketing facilities and costs, volume of production and effect of the new production on markets and prices. It is small wonder that errors of estimate in attempts to evaluate and integrate these many considerations result in developments that look fine on paper in advance but do not always work out in practice.

I

One of the most common fallacies in planning irrigation development, particularly supplemental irrigation, is the assumption that the entire increment in net income over and above other direct cash costs, that results from an input of irrigation water, necessarily will be available to pay for the irrigation water. Although in theory such increases may be thus available, experience has shown that usually they are distributed to other factors as well as to irrigation water, with resultant increase in land values, level of living, taxes, and other items, even though this results in delinquency in irrigation payments. Even though irrigation payments are a first lien on the land, it may not be practicable for either a public or a private agency to collect them if the water users as a group feel that

* The author gratefully acknowledges helpful criticisms and suggestions from Howard E. Conklin and others.

they are unreasonable. The ideas of the water users as to what are reasonable payments are likely to be influenced more by the amount of irrigation payments, land values, and level of living, in other similar areas than by a logical analysis indicating that they should continue high irrigation payments at the expense of land values and level of living.

High irrigation payments frequently are not fully discounted in making mortgage loans. Consequently, part of the net return that theoretically should be available for irrigation payments is required for mortgage payments. When debt adjustment becomes necessary, mortgage holders and water users may unite in pressure for downward readjustment of irrigation payments.

Surprisingly few data are readily available as to current irrigation payments under varying conditions. Those familiar with various irrigation projects often have a feeling, based on general observation, that proposed payments on a new irrigation development are out of line with those proven feasible under similar conditions elsewhere. Because of lack of specific data, however, it is difficult to controvert the paper budgets on which the proposal is based.[1]

Determination of the feasibility of a proposed irrigation project is usually approached by the "budget" method. Estimates are made of increased returns that farmers are likely to realize from the use of the water that would be made available. Against this estimated increment in returns is set the estimated aggregate of increased expenses, other than the new water costs, that are likely to be associated with the new or expanded development. The difference between the anticipated increases in returns and the increases in costs associated therewith is considered available for meeting water charges. If the water supply can be brought in at a cost equal to or below the sum thus estimated as available for meeting water charges, the proposed development is considered feasible.

There is nothing inherent in the budget approach to prevent due allowance for the likelihood that the users of the new water may develop ideas of what constitute reasonable water charges that differ more or less widely from conclusions that may be reached in theory. Allowances can be made for probable increases in standards of living, land values and the like. However, because there is no a priori basis for making these allowances, an empirical determination

[1] Reference is made to bona fide calculation of feasible payments by disinterested technicians rather than to the unsound promotional type of proposals that frequently is made.

of the character and associated effects of these factors, as found in actual situations, is necessary.

For older established irrigation projects, factors affecting the ability and willingness of farmers to pay water charges have been operating sufficiently long to reflect their net effects in the levels of payments now being made. A study of past experience can thus provide a basis for checking budget estimates in respect to factors ordinarily considered and, in addition, can supply information on the extent to which farmers' attitudes toward given levels of water costs ordinarily change over time under given conditions. If it is possible to determine the charges that are being paid successfully, and the charges that have proved excessive, under reasonably well defined complexes of conditions, charges of proposed projects can be judged in the light of past experience on projects having essentially similar conditions. In this manner a supplementary method would be provided for quantitatively evaluating the more important factors affecting probability of success in a new development.

From the fund of past experience we want to know the maximum water charges that can be paid successfully under given circumstances. In general, this problem, insofar as it has been addressed, has been approached through case analysis methods.[2] These case studies have frequently been exhaustive in their analysis of given situations but have produced few well defined statements of relationships that can be broadly generalized.

Statistical analysis of experience in meeting irrigation payments on various types of irrigation projects offers an alternative to the case analysis approach by which it should be possible to develop generalizeable relationships and define limits of probability within which such relationships might be applied to new situations.

Type of farming on existing projects reflects the composite influence of climate, soil, prices, marketing conditions, and other circumstances and therefore might be a satisfactory index to summarize the effect of the physical and economic factors involved. Determination of feasible type of farming on a new project, while

[2] See, for example, R. P. Teele and Paul A. Ewing, The economic limits of cost of water for irrigation, Boulder County, Colorado, a preliminary report. Burs. of Ag. Econ. and Pub. Roads. U.S.D.A. Mimeo. 1926 (series of similar reports for other areas); W. L. Powers, The economic limit of pumping for irrigation, Ore. Expt. Sta., Bul. 235, 1928; Frank Adams and Martin R. Huberty, Permissible annual charges for irrigation water in upper San Joaquin Valley, Calif. Div. of Water Res., Bul. 34, 1930; Medford irrigation district, Oregon: rehabilitation and agricultural report to state reclamation commission of Oregon, Div. of Irrig., Bur. of Agri. Eng., U.S.D.A. in cooperation with Ore. Ag. Exp. Sta. Mimeo. 1932.

admittedly difficult, is based less upon a residual between figures with large error of estimate than is calculation of the value of water; also, determination or assumption of a type of farming is one of the necessary steps before the economic value of the water can be calculated. Contemplated irrigation costs for a prospective type of farming that are too far out of line with payments demonstrated to be feasible for similar types of farming elsewhere at least should suggest that the justification of the proposed cost be scrutinized more carefully.

II

As a preliminary and admittedly somewhat superficial exploration of the possibilities of this approach, a few relationships between type of farming and irrigation payments in California and Utah have been studied. Results of this study are presented not as conclusive findings but merely as an illustration and suggestion for more adequate investigation.

Data were obtained from the Berkeley Land Bank and from published reports. From several hundred irrigation projects for which varying amounts of data were avaiable in the Land Bank files, 125 projects were selected for which sufficient information was given to indicate the total irrigated acreage, type of farming, and annual irrigation payments per acre in one or more years subsequent to 1930. By project is meant the area irrigated by a single public utility, mutual water company, irrigation district, or other organization. Projects were not included if the available information indicated there was serious financial delinquency or seriously inadequate water supply—in other words, the sample was limited, as nearly as could be determined, to projects that are currently successful or at least "going concerns." The annual irrigation payments include all payments per irrigated acre by the water users covering tolls, fees, levies, and assessments for operation, maintenance, interest, capital or principal payments, and other items appurtenant to their irrigation water supply. The payments do not include interest on investment that was not incurred as cash expense, nor the value of labor by the farmers on irrigation maintenance that was not a cash payment. Comparable data for 119 additional projects for the year 1929 were obtained from published statistics.[3]

[3] Harry F. Blaney and Martin R. Huberty, Cost of irrigation water in California, 1930; a cooperative report by the Div. of Agr. Eng., U.S.D.A. and the College of Agri., Univ. of Calif.; Calif. Div. of Water Res., Bul. 36, 1931.

The 244 projects for which data were available were classified as to type as indicated in Table 1. As low as 10 per cent of the crop acreage of a project in citrus fruit seemed to give a significant type differentiation, doubtless because of the relatively high value of citrus fruit and special conditions necessary for its production. A few citrus and non-citrus orchard projects of less than 100 irrigated

TABLE 1. BASIS OF CLASSIFYING IRRIGATION PROJECTS AS TO TYPE OF FARMING

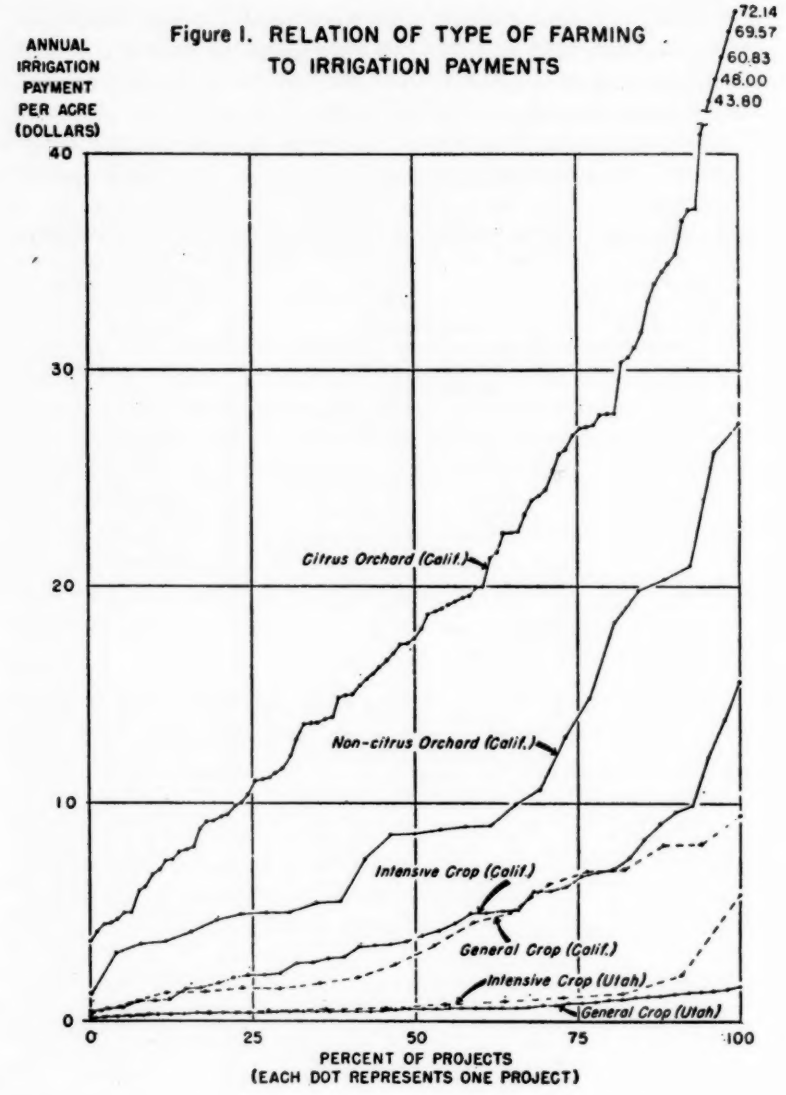
Type of farming	Crop	Per cent of acreage
Citrus orchard	Citrus orchard[1]	Over 10
Non-citrus orchard	Citrus orchard[1] All orchard[2]	Not over 10 Over 50
Intensive crop	Citrus orchard[1] All orchard[2] All orchard and row crops[3] Rice	Not over 10 Not over 50 Over 25 Not over 25
General crop	Orchard and row crops[3] Pasture	Not over 25 Not over 75

[1] Including avocados.
[2] Including nuts and olives.
[3] Including small fruits and rice.

acres, intensive crop projects of less than 500 acres, and general crop projects of less than 1,000 acres were discarded with the thought that unusual costs may exist on very small projects that may not be feasible in general. Groups of from 12 to 95 projects were available in California projects for each of the four type classes and in Utah projects for the general and intensive crop classes (Table 2). Smaller numbers of projects in other states or not falling within the specifications of these classes were discarded.

TABLE 2. NUMBER OF PROJECTS AND TOTAL IRRIGATED ACREAGE BY TYPE OF FARMING

Type of farming	Number of projects	Total irrigated acres
Citrus orchard (Calif.)	95	249,157
Non-citrus orchard (Calif.)	27	49,869
Intensive crop (Calif.)	42	20,111
General crop (Calif.)	18	214,832
Intensive crop (Utah)	12	31,006
General crop (Utah)	50	199,854
Total	244	764,829



Average annual payments per acre on the individual projects are arrayed in a percentage distribution chart in Figure 1.

The consistently higher annual payments in California than in Utah in both the intensive and general crop areas are made possible by certain higher value crops that are raised in California but not

in Utah by higher yields resulting from lower altitudes and longer growing season, and by market advantages. The California areas are predominantly in the lower valleys and the payments therefore are not indicative for higher altitude areas in California.

It is not suggested that these arrays of existing irrigation payments by type of farming be used to determine feasible payments on new projects without consideration of elements involved in each individual situation, but merely that this approach be used to supplement and check the conventional budget analysis. It should place the investigator on guard against error of estimate and fallacious reasoning that might encourage proposal of unduly high payments. The higher payments in each of the arrays may be possible because of individual circumstances that do not exist in some of the projects with lower costs, and that may not be present in the contemplated new project. Investigation of some of the higher cost projects in the arrays probably would show that the payment actually is higher than can be carried permanently and that they are headed for failure unless a scaling down of payment can be made. On the other hand, the new project might have a combination of circumstances that would justify a higher payment than on any existing project.

Even this incomplete analysis, however, suggests that in Utah payments of more than $1.25 per acre should be very carefully considered unless a type of farming involving 25 per cent or more of cultivated row crops is feasible, and that even with the more intensive type of production, payments of more than $2.00 are subject to question. In California a payment of $7.50 per acre appears to be very nearly the upper limit for the less intensive type of production, and $10.00 for the more intensive; while payments of more than $20.00 for non-citrus fruit and $35.00 for citrus fruit areas, as defined, are very unusual.

The available data were inadequate to permit correlating the amount of delinquency in payments with the size of payments in each type of farming group. It is possible and even probable that some of the lower cost projects in each group are near the upper limit of feasible payments, while others could support higher payments if it were necessary. In other words, this analysis is significant only to indicate a ceiling of maximum payments that are being carried more or less successfully by each type of farming.

III

In repayment-experience studies, made for the purpose of establishing repayment ceilings, interest would center in projects with serious delinquency in irrigation payments by individual water users on the project.[4] The studies would be focused on feasible water payments as distinguished from the degree of success of the irrigation enterprise as a whole or the general financial success of the farmers, although the size of water payments usually is closely related to the success of both the irrigation enterprise and the farmers. In some cases, however, the irrigation enterprise might continue in a fairly successful condition, both physically and financially, even with considerable delinquency in payments by water users. On the other hand, the water users might be fairly successful on the whole and yet not meet their water payments because they think the payments are too high and that they can get a downward readjustment.

Although interest would center in projects that are marginal in the sense indicated, data would be required on characteristics of successful as well as unsuccessful projects in order to determine whether the marginal projects have significantly different characteristics. Consideration would need to be given to such possible sources of variation as those due to low original construction costs in relation to benefits, delinquencies due to expectations of downward readjustments in water charges, the extent to which previously accumulated capital is drawn upon to support water charges, the financial reorganization and debt scaledown history of the enterprise, possible inequitable apportionments of irrigation charges, as well as the influence of joint responsibility for the obligations of the enterprise.

The suggested approach, however, rests on the hypothesis that each type-of-farming classification reflects complexes of physical and economic conditions sufficiently similar that an irrigation payment ceiling can be established for it without detailed analysis of yield, cost and price relationships for each project. Certainly the validity of this hypothesis needs further testing by analysis of pertinent data. If found to be tenable, the principal need for yield, cost and price data would be for identifying and isolating signifi-

[4] The writer is not arguing that the entire cost of an irrigation project should be borne by the users of the water. Whether part of the cost should be apportioned to others who benefit indirectly is beyond the scope of this discussion.

cant types of farming into which irrigation projects would be grouped rather than for analysis of financial profit or success.

Likewise, the water payment standards that might be established would be applied to new projects through the medium of type of farming. The determined ceiling of payments for the type of farming contemplated on the new project would serve as a check on the feasible payments calculated from forecasts of future yields, costs and prices, serving to place the forecaster on guard if the computed payments exceeded the ceiling based on experience. It would not eliminate the difficult necessity of forecasting costs and prices in order to forecast type of farming. Experience on existing projects would be useful in forecasting land use and yields but might be of little value for price and income forecasting.

As has been explained, payment-delinquency data in the exploratory analysis described above were inadequate for correlating delinquency and size of payment within the type of farming groups. It was possible only to show the maximum existing payment for each type of farming, not the size of payment above which serious delinquency occurs. The ceilings for feasible payments (if they exist) probably are somewhere below the maxima of existing payments. With suitable data a statistical determination could be made of the extent to which delinquency may be explained by size of payment. If high correlation were found between these variables for given types of farming, more definite ceilings of feasible payments could be established. The amount of this correlation might be increased by a more refined type-of-farming breakdown.

Even with high correlation between delinquency and payments, there doubtless would be considerable unexplained variation, this being associated with factors not closely correlated with either type of farming or size of payment. Relationships of such factors might be determined by introducing those most likely to be significant into a multiple and partial correlation analysis. With delinquency in payments as the dependent variable, the independent variables in addition to type of farming and size of payment might include such items as the amount of irrigation water per acre; land values; yields per unit of major crops or important kinds of livestock; important costs such as taxes, wages, mortgage payments, marketing expense, etc.; prices received for major products; and maladjustments in organization and operation of individual farms.

Consideration would need to be given to variation in size of

payments on individual projects because of differences in quality of land or other reasons. In some cases delinquency may result not because the *average* payment is not feasible but because the payments are not equitably apportioned among different land classes. In such cases the delinquency would be closely associated with certain kinds of land which would be disclosed only by individual analysis of each project.

Question may be raised as to whether the nature of the costs that would be considered as fixed for an established project may be quite different from such costs in a new project. Costs of this type include land improvements (buildings, orchards, etc.), mortgage debt, taxes to some extent, and possibly land values. The results of a situation in which returns to the various factors have been established may not be applicable to an area where such returns are still flexible and essentially residual. On the other hand, returns to the various factors may be more closely correlated with type of farming than they are residual in nature. Especially valuable would be historical data on projects that have failed or on which successive reductions in payments have been necessary. Appropriate examination and analysis of such data for selected supplemental irrigation projects should contribute materially to understanding of distribution of income to the factors of production in irrigation farming.

RATIONING OBJECTIVES AND ALLOTMENTS, ILLUSTRATED WITH SUGAR DATA[1]

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Current preoccupation with the use of a rationing mechanism refers to the employment of the administrative machinery of government to effect the allocation among consumers of goods made scarce by the impact of war. Essentially, it reflects dissatisfaction with the expected results of such allocations if accomplished by the market mechanism. Left to its own devices, the market mechanism will determine who will consume the available supplies by setting a price so high that the quantity demanded at that price is equal to the supply. If all per capita incomes were equal, the restriction of consumption would be at the expense of the less intensive wants filled by the extra quantity previously available to the community, provided we assume that all members of the community have an equal capacity for the satisfaction of wants.[2] Actually, unequal incomes will make ability to pay a determinant in addition to urgency of wants in determining the incidence of the burden of restricted consumption. Even so, the market does not affect intra-family allocation.

1. *Why Do We Ration?*

Given both an inability and unwillingness on the part of the government to use taxation and forced savings to drain away from consumers the means of purchasing goods to the same degree that it withdraws materials and men from their production, rationing may be introduced either to supplement or obviate the necessity for price control. Rationing is, in this case, a product of the combat against the inflationary consequences of generally rising prices with their attendant increased war debt, reduced acceptability of currency, upset creditor-debtor relationships, and altered status on the market of consumers with incomes of divergent rigidity.

However, effective price ceilings alone should suffice to prevent

[1] This study has been carried out under Project No. 628, Iowa Agr. Exp. Sta., Iowa State College, Ames, Iowa. Valuable criticisms and suggestions have been made at one stage or another of the analysis by Profs. T. W. Schultz, M. G. Reid, A. G. Hart, G. Tintner, and M. J. Bowman.

[2] Cf. Lionel Robbins, Interpersonal comparisons of utility. *Economic Journal*, XLVIII: 192, Dec. 1938. Robbins argues that such an assumption should be implicit in the policy determination process of a democratic society. "Political calculations which do not treat all men as if they were equal are morally revolting."

an inflationary price spiral. In such an event, distributors may allocate their supplies arbitrarily—on a first-come-first-served basis, discriminating in favor of old, volume, or cash customers, etc. The further back from the retail level toward the primary producer the price fixing occurs, the more numerous will be the occasions for discriminatory allocations of this nature. Government must then intervene to stipulate the criteria on which the distribution at the retail level should be based if the sense of equity of the community is violated by the results of the arbitrary allocation forced on private business by the imposition of the price ceiling.

Yet even if there were no danger of a general inflation, the use of an administrative rationing mechanism during war-time might be dictated by a general sentiment that income status should not prejudice one's right to essential goods made scarce by the war. If there were complete equality of income, awarding consumers equal rations of a suddenly severely limited supply of some commodity would yield consumers no benefits that would not better be achieved by the price system.[3] Furthermore, people are apt to be much more sensitive to restrictions on available supplies of consumers goods during war-time, and particularly is this likely to be true in the case of the more common foodstuffs. Shortages are expected as a result of previous war experience, and indications of their approach are watched. The result is not only private hoarding and consequent aggravation of the shortage situation, but also a demand for rationing in order to prevent both the hoarding and the inequitable distribution.

Still another possible motive for rationing may be a desire to use the food supply as an indirect means of production to be used to maximize the efficiency of that part of the population directly engaged in producing war materials. This has been a very important criterion in the German rationing system, but it has played a much lesser role in democratic communities precisely because its extreme use by the Nazis does violate democratic conceptions of equity. Nevertheless, we do expect the food needs of civilians to be subordinated to those of the military forces, and there may be a good case for some weighting of needs in order to assure armament workers enough food to keep their working efficiency at a peak.

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[3] Cf. J. J. Pollak, Rationing of purchasing power to restrict consumption. Economica, VIII: 31, Aug., 1941, p. 224.

2. *Alternatives in Rationing Objectives*

Our analysis of the motives behind administrative rationing of foodstuffs in war-time leads, then, to the conclusion that the basic objective is the equitable distribution among consumers of food supplies made scarce relative to consumer demand by the exigencies of war, tempered by the desire to maximize the work capacity of laborers engaged in armament production. Yet if we are to evaluate rationing policies in such terms we must make specific the sense of the community as to what does constitute "equitable distribution." Moreover, the attempt to devise an equitable rationing mechanism requires a reconciliation of alternatives, not only as respects the definition of equity but also as respects the conflict between greater equity and simplicity of administrative design.

a. *Administrative Simplicity vs. Increased Equity*

With administrative ability one of our scarcest resources in the war effort, the cost of achieving a more equitable rationing system is not to be dismissed lightly in evaluating alternative techniques and criteria for allotting rations.

The more closely we attempt to make the individual allotments approximate our conception of equity, the more complicated the administrative system will become. To use a *reductio ad absurdum*, the most equitable allotment system might involve examining each consumer and basing his food ration on his particular status relative to the predetermined standard of equity.

Our first sugar rationing in January, 1942, took the form of forbidding purchases and stocks of dealers to exceed the quantities they bought or carried in 1940. In February and March they were limited to 80 per cent of their use or resale during the same months of 1941. The Patman small business committee hearings brought forth charges of bootlegging, pressure by wholesalers to force sales of other commodities when selling sugar, and inability of special retail outlets such as drug stores to get needed supplies.[4] A February War Production Board order directed sugar dealers not to "favor purchasers who purchase other products nor to discriminate against purchasers who do not purchase other products." The present technique of assigning per capita allotments to ultimate consumers and employing governmental compulsion to enforce those

[4] Reported in Sugar, Apr., 1942, p. 17.

allotments is a much more expensive one than this initial scheme of rationing at the wholesale distributor level, but apparently the expected increased equity of distribution is deemed worth the additional cost. Canada is attempting to get similar allocation among consumers at lesser cost by informing the public of the amount to which each person is entitled and trusting to patriotic appeal and social pressure to enforce the allotments.

b. *Different Interpretations of Equity*

Equitable allocation might be interpreted as:

a. Equal per capita rations
   i. equal consumption of each commodity by all members of the community
   ii. equal rights to consumer goods, irrespective of income status
b. Proportionate reduction of the consumption of all members of the community from prewar levels
c. Use of a need criterion
   i. rations adjusted to physiological requirements
   ii. greater weight to needs of individuals engaged in war industries

3. *Evaluating Objectives in Determining Rations*

Having decided to embark on a program of assigning to individuals allotments of specific commodities, we must develop those criteria for determining rations which conform most closely to our objectives. We must analyze the various possible interpretations of "equitable allocation" given above in order that we may accept or reject each one in part or in its entirety, and so determine the most desirable complex of criteria, conditioned by the need to minimize administrative complexities.

I shall proceed to reconcile these various objectives of rationing on the assumption that we want so to distribute our supplies of consumer goods as to maximize the satisfactions derived therefrom, insofar as this is consistent with a desire to keep the efficiency of workers in war industries at a maximum.

Any consideration of the impact of different systems of allotting rations of specific foodstuffs requires taking cognizance of the relationships between different commodities in consumers' budgets. A given change in the consumption of a commodity imposed by the

rationing system on different individuals will have divergent consequences, depending on the quantity of that commodity previously consumed by each, the quantities of substitute and complementary commodities previously consumed by each, their relative savings, the relative marginal rates of substitution for the different individuals between the commodity and its substitutes, and the relative availability of substitutes. These factors will vary somewhat for every individual, but we can isolate certain elements which should cause divergent consumption patterns among broad groups of people and attempt to adjust our rationing system to take care of these major elements of non-homogeneity among individuals as respects their reaction to rationing of any particular foodstuff. These elements are (1) geographical area (2) type of community—large cities, medium-sized and small cities, villages, farms (3) income (4) family size (5) physical characteristics of the individuals such as weight, age, sex, activity.

a. *Equal Per Capita Rations*

Because there are such elements of heterogeneity in the consumption patterns of different groups of individuals, the establishment of equal per capita rations for specific commodities is very likely not to result in maximization of utilities derived from the available supplies of consumer goods, even on the assumption of equal capacity for satisfaction of wants of individuals of similar physiological status.

The establishment of equal per capita rations for groups of commodities, such as for the food group as a whole or for a group of foodstuffs closely related in consumer budgets, would be much preferable to separate rations of individual commodities. This would, of course, introduce the problem of finding a common denominator for combining the various items included in a given ration. This might be solved by assigning weights based on relative scarcity of quantities of resources involved in each commodity, or by fixing the ration in money terms and letting their relative prices serve as weights.[5] Such allotments would probably make adequate allowance for the heterogeneity resulting from differences in taste

[5] Cf. J. H. Richardson, Consumer rationing in Great Britain. Canadian Journal of Political and Economic Science, VIII: 1, Feb., 1942. V. Abramson and C. F. Phillips, The rationing of consumer goods. Journal of Business of the University of Chicago, XV: 1, Jan., 1942. J. J. Pollak, ibid.

and in relative availability of different commodities in different types of communities and in different geographic areas.

The allocation of an equal number of ration coupons to all people does not allocate equal power to purchase those rations, and low-income families may well be unable to make these purchases. This may make possible larger rations for those with sufficient incomes than would be indicated by the supply per capita available for consumption.[6] However, if the rations as determined represent the sense of equity of the community as to how the available supply should be allocated among its members, the inability of some people to purchase their ration means a distortion of this equitable pattern. Some subsidization of low income consumption to ensure the ability to purchase rations, especially of essential foodstuffs, would seem to be a logical accompaniment of a sound rationing program.

We would expect larger families to consume less per capita of any commodity than smaller ones with identical incomes, except perhaps in case of those few commodities which are so-called "inferior goods." This is simply to say that the income level which it is deemed essential to subsidize should be fixed so as to take into account the number of people who have to be supported by that family income. Moreover, this means that assigning equal per capita rations will result in larger families not having to restrict their consumption as much as smaller ones.

Objection might be made to assigning to children under 12 years of age rations equal to those of adults, since such children require less food in calorie terms than adults, though more of certain food items such as milk. However, it may be a valid public purpose to minimize the impact of the war on the nation's children, and allowing them rights to as much food as adults may simply be a way to minimize restrictions on their food consumption even in the face of a national shortage. It must be remembered, nevertheless, that the rations of individuals are pooled into family rations, and the manner in which the family ration is divided up among the various members of the family will probably have little relationship to the proportion of the family allotment contributed by each member. Still, this does make it possible for families to maintain the food consumption of their children at pre-war or nearly pre-war levels without unduly penalizing the adult members of such families.

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[6] Cf. Rutherford and Rutherford, The Consumption and Rationing of Meat and Cheese. Oxford Economic Studies, No. V, 1941.

b. *Proportionate Restriction*

The idea that proportionate reduction in the consumption of all people is identical with equalizing the burden on all people is an old fallacy in economic thinking. It would be true if income were equally distributed, and it would have some validity if there were no minimum below which consumption should not be allowed to fall. An unequal pattern of food consumption tenable at a high level may be insupportable at a lower level of consumption, where the poorer members are below minimum standards and the wealthy are still somewhat above it.

Furthermore, proportionate restriction of single commodities can have widely different results even among persons of equivalent real incomes, because their different habit patterns may have created substantially divergent marginal rates of substitution between the commodity and its substitutes.

We have already noted that proportionate restrictions as among adults and children may be quite undesirable. The final blow to any proposal of proportionate restriction of the consumption of different individuals is the gigantic administrative problem that would be entailed in first determining the pre-war consumption of each individual or family and then assigning its ration accordingly.

c. *Use of a Need Criterion*

The use of a criterion of the nutritive requirements of the individual as the basis of assigning allotments is also open to the same criticism of entailing a tremendous administrative task. Needs of individuals vary with age, size, sex, activity, and state of health. Probably the assumption that the needs of all individuals are identical is, however, a satisfactory first approximation. However, because need differences do exist, especially as among healthy and ill individuals, provision should be made for establishing local boards with additional rations to be distributed among people who bear a physician's endorsement of their exceptional physical requirement of additional allotments.

Again, it must be pointed out that only in unusual cases are individuals unable to dispense entirely with any single foodstuff without ill effects on their well-being. The relative availability of substitutes is of the utmost importance. It is also noteworthy that it is possible to provide an adequate diet at different cost levels and also with different margins of safety above minimum needs of essential nutrients.

TABLE 1. QUANTITY OF SUGAR CONSUMED PER FAMILY PER WEEK (POUNDS)

	Urban Households, May–August							Farm Households, March–November				
Income	N.Y. & Chicago	New Eng. E. Cen. Large & Middle-sized Cities	New Eng. E. Cen. Small Cities	South-east Large & Middle-sized Cities	West Central & Rocky Mount. Large & Middle-sized Cities	Pacific N. W. Large & Middle-sized Cities	South-east Negroes Large & Middle-sized Cities	New Eng. Middle Atlantic North Central States	Plains, Mountain Pacific States	South-east States, White	South-east States, White Sharecroppers	South-east States, Negroes
	1	2	3	4	5	6	7	8	9	10	11	12
0– 499							3.1	5.6	4.6	3.7	3.9	3.1
500– 999	2.6	3.3	3.7	3.7	2.8	3.7	3.9	5.6	4.6	4.7	4.3	4.1
1,000–1,499	2.7	3.6	4.0	4.0	3.5	3.5	4.3	6.3	5.0	5.4	4.9	4.3
1,500–1,999	2.7	3.7	4.8	4.3	3.4	3.4	4.6	6.6	4.7	5.5	5.4	4.5
2,000–2,999	3.2	3.9	4.7	4.4	3.5	3.4	5.0	7.4	5.8	5.8		5.2
3,000–3,999	3.2	3.8	3.5*	4.9	3.3	3.1	5.2*					
4,000–4,999	3.3	4.2		4.9	2.5	3.3		7.3	5.7	6.5		
5,000–7,499	3.1	3.6*		5.4*	3.2*	4.1*		6.5*	5.3*	6.8*		
7,500 and over	3.7											
All incomes								6.3	4.9	5.1	4.4	3.6

* Data for highest income class in each area are for families with minimum income in that class and over.

Source: Consumer Purchases Study, 1935–36
Urban data: Bureau of Labor Statistics Bulletin No. 648, Table 5
Farm data: U.S.D.A. Misc. Publ. No. 405, Table 50

Degree of activity is an important factor in determining need variations among individuals for any particular nutrient, and an inadequate supply of some nutrients is quite capable of seriously diminishing one's working efficiency though perhaps not of severely impairing health except over a very long period of time. In the case of such commodities, a plan whereby extra ration coupons would be distributed to employers of war labor on the basis of the number of workers they had in exceptionally strenuous occupations seems to be practical with a minimum of administrative difficulty. Such employers could get their coupons from the local rationing board, perhaps with the requirement that their applications be certified by the W.P.B. office which awarded their contract.

4. *Determining Sugar Rations*

The preceding considerations can best be concretized by examining the impact on consumption patterns of rationing a given commodity. We shall use data on sugar consumption for illustrative purposes not only because sugar is the first foodstuff to be rationed at the consumer level in the present war, but also because many of the problems of determining equitable rations are at a minimum in the case of sugar.[7] Product differentiation is probably as unimportant in the case of sugar as for any foodstuff, and the commodity is generally consumed among all classes of the population.

Another reason for using sugar as our illustration lies in the existence of considerable data on consumption made available by the Consumer Purchases Study of 1935–36. Both average retail prices and supplies of sugar available for distribution have fluctuated so little between 1936 and 1940 that it is reasonable to assume that the pattern of sugar consumption up to the beginning of the defense program was essentially the same as that indicated by the 1935–36 data. The average retail price of sugar per pound ranged between 5.5 and 5.7 cents in 1936 and between 5.1 and 5.4 cents in 1940, while supplies of raw sugar available for consumption per capita went from 102.1 in 1936 to 96.4 in 1938 and 107.9 in 1939.[8]

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[7] Cf. J. H. Richardson, ibid. Richardson points to sugar as the simplest type of commodity for which to establish allotments. However, his assertion that equal per capita rations can be regarded as satisfactory is founded on an unsophisticated concept of product differentiation. Bought cakes are a substitute for granulated sugar in the budgets of different consumers and must be regarded from the economic point of view as a different "quality" of sugar.

[8] U.S.D.A. Agricultural Statistics, 1941.

TABLE 2. AVERAGE QUANTITY OF SUGAR CONSUMED PER HOUSEHOLD PER WEEK BY INCOME, FAMILY TYPE, AND REGION, URBAN FAMILIES, MAY–AUG., 1936 (POUNDS)

Income & Type	N.Y. & Chicago	N. Eng. East Central Large & Middle-sized Cities	N. Eng. East Central Small Cities	South-east White Large & Middle-sized Cities	West Central Rocky Mount. Large & Middle-sized Cities	Pacific North-west Large & Middle-sized Cities	South-east Negroes Large & Middle-sized Cities
	1	2	3	4	5	6	7
Type 1							
$ 0– $500							2.3
500– 999	1.9	2.5	1.7	3.2	2.4	2.6	3.2
1,000–1,499	2.1	2.8	3.2	3.5	2.8	3.2	3.7
1,500–1,999	1.8	2.7	4.2	3.6	2.7	2.7	4.6
2,000–2,999	2.2	2.7	3.2	3.3	2.6	2.3	4.5
3,000–3,999	2.2	2.9	3.1	3.9	2.6	2.2	
4,000–4,999	2.1	2.9		2.9	2.6	1.8	
5,000–7,499	2.9	2.6		3.1	2.5	2.5	
7,500 and over	3.0						
Types 2 and 3							
$ 0– 500							3.1
500– 999	2.9	3.2	3.8	3.7	2.8	3.9	3.8
1,000–1,499	3.0	3.4	3.7	4.1	3.4	3.1	4.4
1,500–1,999	2.8	3.4	3.8	4.2	3.6	3.3	4.1
2,000–2,999	2.9	3.6	3.8	4.6	3.6	3.5	3.9
3,000–3,999	3.0	2.8	3.4	4.6	3.0	3.2	
4,000–4,999	3.2	4.7		5.7	2.4	2.2	
5,000–7,499	2.1	6.1		5.6	3.2	3.9	
7,500 and over	3.8						
Types 4 and 5							
$ 0– 500							3.6
500– 999	2.8	3.6	4.5	4.1	3.4	5.4	4.3
1,000–1,499	2.9	4.4	4.5	4.6	4.4	4.5	4.4
1,500–1,999	3.4	4.4	5.2	5.1	4.0	4.3	4.9
2,000–2,999	3.9	4.6	5.7	5.1	4.3	4.1	5.9
3,000–3,999	3.7	4.4	3.3	5.8	4.0	3.8	5.3
4,000–4,999	3.8	4.6		5.3	2.6	4.7	
5,000–7,499	4.2	2.6		6.2	3.6	4.9	
7,500 and over	4.1						
Types 6 and 7							
$500– $999	3.9	6.1	4.4	4.2			
1,000–1,499	3.6	5.5	6.0	4.5			
1,500–1,999	4.0	5.9	7.9	4.9			
2,000–2,999	4.6	5.5	6.0				
3,000–3,999	4.6	7.4	5.8				
4,000–4,999	4.3	4.0					
5,000–7,499	4.1						
7,500 and over	4.2						

Source: Consumer Purchases Study, Bureau of Labor Statistics, Bull. No. 648. Computed from Tables 4 and 5.

Before proceeding to analyze the pattern of sugar consumption in this country, we should note its role. It is not an essential element in the human body, providing neither vitamins, proteins, nor minerals. It is, however, a relatively inexpensive and concentrated source of calories, and for many people its addition to a large number of foodstuffs greatly increases their palatability. Calories are, of course, provided by most foods in various quantities, and the quantity of sugar required to provide energy will depend essentially on the character of the rest of the diet. So long as alternative inexpensive sources of calories are available, inequities in the sugar rationing process will not be too important, except perhaps from the point of view of morale.

Table 1 presents average quantities of sugar consumed per family per week by income and region for both urban and farm households. Tables 2 and 3 provide data with families classified by type. Type 1 families include two people, types 2 and 3 include 3–4 people, types 4 and 5 consist of 3–6 persons, and types 6 and 7 consist of 5–8 individuals. All types have various specifications as to age and sex composition of their individuals.

a. *Variation of Consumption by Geographic Areas*

Apparently habits and environment vary sufficiently among different sections of the country to create significant differences in quantities of sugar purchased. Table 2 reveals that white urban consumers in the southeast and in northern small cities are heavier consumers of sugar than those of other areas, and that New York and Chicago people are the highest consumers of all. The consumption of sugar in an area probably depends essentially on the consumption of certain complementary foodstuffs which are habitually sweetened with sugar (e.g. coffee, tea), and on the extent to which pastries and desserts are bought in prepared form with sugar already added. Obviously equal rations in all areas will force a lesser readjustment of previous consumption patterns in those areas which had been accustomed to consume least sugar. Still, New York and Chicago families did purchase more store cakes, more pounds of candy, and more canned fruit than families in other areas.[9] These products all require considerable quantities of sugar, and all industrial users of sugar are being rationed after May 5 at 70 per cent

[9] Bureau of Labor Statistics, Family expenditures in selected cities, 1935–36, Vol. II, Bul. No. 648, table 5.

TABLE 3. AVERAGE QUANTITY OF SUGAR CONSUMED PER HOUSEHOLD PER WEEK BY INCOME, FAMILY TYPE, AND REGION, FARM FAMILIES, MAR.–NOV., 1936 (POUNDS)

Income and Type	N. England, Middle Atlantic, and N. Central States	Plains, Mountain, and Pacific States	Southeast States White	Southeast States, White Sharecroppers	Southeast States Negroes
Type 1	*4.6*	*3.9*	*3.9*	*3.4*	*2.9*
$ 0– 499	4.1	3.6	3.1	3.3	2.7
500– 999	4.2	3.7	3.8	3.3	3.1
1,000–1,499	4.9	4.2	3.9	4.4	3.2
1,500–1,999	4.7	3.4	4.9	3.2	
2,000–2,999	4.9	3.7	5.3		
3,000–4,999	5.5	5.4	4.3		
5,000 and over	5.0		5.2		
Types 2 and 3	*6.0*	*4.8*	*4.6*	*4.0*	*3.4*
$ 0– 499	5.4	4.7	4.1	3.9	3.1
500– 999	5.4	4.5	4.5	4.2	3.8
1,000–1,499	6.0	4.8	4.9	4.2	4.0
1,500–1,999	6.2	5.0	5.1	4.2	3.5
2,000–2,999	6.6	5.3	5.1	4.1	
3,000–4,999	6.0	3.9	5.0		
5,000 and over	6.3		6.3		
Types 4 and 5	*7.0*	*5.7*	*5.4*	*5.0*	*4.0*
$ 0– 499	7.4	5.6	3.9	4.5	3.3
500– 999	6.6	5.4	5.0	4.8	4.4
1,000–1,499	6.7	5.5	5.8	5.4	4.2
1,500–1,999	7.0	5.2	5.4	6.2	4.2
2,000–2,999	7.7	6.8	5.7		4.0
3,000–4,999	7.5	6.7	7.4		
5,000 and over	7.5	5.2	7.4		
Types 6 and 7	*7.6*		*5.8*	*4.7*	*4.0*
$ 0– 499	7.2		4.0	4.0	3.3
500– 999	6.7		5.2	4.6	4.2
1,000–1,499	7.2		6.1	5.1	5.0
1,500–1,999	7.7		6.5	5.8	5.5
2,000–2,999	8.7		6.8		
3,000–4,999	8.7		6.5		
5,000 and over	6.2				

Source: Consumer Purchases Study, U.S.D.A. Misc. Publ. No. 405, Table 50.

of their purchases in the corresponding months of last year. If consumption of sugar purchased in prepared or manufactured form is restricted at the same rate as consumption of household sugar, part of the discrepancy in the burden placed on different urban areas by the equal per capita rationing of sugar will be reduced. A failure to ration on the consumer level these products which use

sugar and bear a competitive relationship to sugar purchases in consumer budgets must lead either to market allocation via higher prices, or to rationing by manufacturers or other private distributing agencies. Application of the same standard of equity would require that rationing of sugar to consumers be accompanied by rationing on the consumer level of sugar products and also of sugar substitutes, the supplies of which cannot or should not be expanded by higher prices.

Moreover, establishing separate equal rations for each of the related products will tend to balance burdens of different groups only when there is substantial consumption of all the products by all the people involved, and when the variations in proportions of the commodities consumed by the different groups is not too great. The lesser restriction of granulated sugar consumption of metropolitan consumers would be partially compensated for by the fact that consumers in other urban areas have to reduce their consumption of sugar products less than people in the metropolitan areas. This is on the assumption that equal per capita rations are assigned for the sugar products as well as for granulated sugar. Probably consumer satisfaction could be further increased by something closer to maintenance of the present proportions between sugar and its products for all classes of consumers. This would probably involve a single ration for all those commodities, assigning a weight to each, and then allowing free consumer choice among the items.[10]

b. *Urban-Farm Variations*

The most notable feature of Table 1 is that for each income class in each region the rural household consumed at least as much sugar as the urban household and usually much more. This is to be explained partly in terms of the much greater canning, preserving and baking done in rural households.[11] The discrepancy between rural and urban households is least in the Southeast and virtually disappears for Southeastern Negroes. It is precisely among these rural families that home canning and preserving is at a minimum. Manifestly, unless farm families receive differential allowances based on

[10] See supra p. 7. The problems involved in determining weights and in transferring stamps in suitable denominations from consumer to retailer as purchases are made are being subjected to further investigation.

[11] Comparison of Tables 2 and 3 does not warrant the conclusion that larger families alone account for the greater sugar consumption of farm families.

the habitual amount of canning, preserving, and baking that they do, they will probably be driven to consumption of these products in prepared form. The amount of substitution of this nature that would occur is beyond the scope of this investigation, but even if a net decrease in the amount of sugar consumed resulted, the increased demand for canned goods would be most unfortunate now that our Far Eastern source of tin supplies has been cut off. At any rate, equal rations of sugar per household would manifestly require a greater readjustment of present consumption patterns by rural than by urban families in the same region and income group. The very substantial divergence in the proportion of sugar to sugar products between urban and farm communities means that rationing both will not have appreciable compensating effects. A ration entitling farmers to purchase prepared desserts and store cakes, which they have not hitherto been accustomed to consume, will be but slight recompense for the tremendous restrictions that would be placed on their home baking and canning if they are rationed no larger quantities of sugar than their urban fellow citizens. The result may be a substantial reduction in real farm income. Urban consumers might well prefer to accept lower sugar rations and have larger quantities of prepared desserts available, allowing farmers to continue their home preserving.

There are other elements to be considered in this situation. Absence of sugar for preserving purposes may result in physical waste of fruits, berries, and vegetables on farms whose production is not large enough to make marketing worth while. Even if they do sell to canneries which have industrial allotments of sugar, valuable tin resources may be used up that would have been saved had the preserving been done on the farm. A desire to prevent the dislocation of factors may induce lesser restrictions on industrial users of sugar than on direct consumers. On the other hand, a desire to free labor resources now engaged in the manufacture of soft drinks, pastries, etc., would lead to greater restriction on industrial sugar consumers than on direct consumers.

By assigning a ration for sugar and sugar products, leaving the consumer to select from among the various commodities involved, the problem of allotting farm families enough sugar to do their usual preserving of home-grown foods could probably be solved with less administrative effort and to the greater satisfaction of all concerned than under the present system of having home canners appear individually before local boards to request extra sugar rations.

c. *Income Variations*

All three tables indicate that income is not a very important factor affecting sugar consumption, though the data probably do not warrant a definitive statement in this respect. Very little reliance should be placed on the top income average in each area, because it is based on relatively few cases and their representativeness is questionable. The rural study excludes farmers who were not native white, who were on relief, or who had not operated the particular farm on which they were interviewed throughout the preceding year. The urban study excludes relief families and those with incomes below $500 a year.

Still the data do indicate some increase in sugar consumption with increased income at the lower income levels. The absence of satisfactory intercommunity cost-of-living indices, which could be used to deflate money incomes, makes it difficult to determine the income level in all areas at which consumption ceases to be seriously influenced by income, but $1000 appears to be about right for types 1–3. The total cost to the lowest income group in Table 1 of consuming as much sugar as the highest income group would have been slight,[12] though the cost of the complementary foodstuffs may be the essential deterrent to increased sugar consumption of low income groups. The tendency for consumption to increase with income at low income levels is more pronounced for farm than for urban families, and more pronounced for large than for smaller family types.

d. *Variations in Family Size*

Tables 2 and 3 indicate quite clearly that expenditures on sugar by a family in a given community with a given income does not increase *proportionately* with the size of the family. It does increase, however, so that the summarized presentation of Table 1 probably conceals a factor which is much more important than income in explaining variations in sugar consumption.[13] Not only is the range of variation greater from the average consumption of the smallest to the largest type family than from the lowest to the highest income

[12] At about 5.5 cents per pound, it would have cost less than 10 cents more per week to obtain for the average family at the lowest income level as much sugar as was consumed on the average at the highest income level.

[13] An analysis of variance of family sugar expenditure in New York and Chicago classified by family type and income resulted in a variance among types over 11 times as great as that among income groups.

group, but the range of variation from type to type is also greater than the variation by income within each type.

The net result is that an equal per capita ration partially counteracts the effect of income in forcing larger families to reduce their per capita consumption below that of smaller families with equivalent incomes.

e. *Variations in Needs*

Table 4 gives quantities of sugar recommended for people with different food requirements at four different levels of nutritive cost and content. Sugar requirements increase with calorie requirements, but the increase is not necessarily proportional. Presumably, for all classes, substantial reduction and perhaps total

TABLE 4. APPROXIMATE YEARLY QUANTITIES OF SUGAR NEEDED BY PERSONS OF DIFFERENT AGE, SEX, AND ACTIVITY AT 4 DIETARY LEVELS (POUNDS)—DAILY CALORIE REQUIREMENTS

	Restricted, Emergency Diet	Adequate, Minimum Cost Diet	Adequate, Moderate Cost Diet	Liberal Diet	Daily Calorie Requirements
Child under 4 yrs.	8	5	7	7	1200
Boy 4–6 yrs. Girl 4–7 yrs.	20	12	15	15	1600
Boy 7–8 yrs. Girl 8–10 yrs.	30	25	30	30	2000
Boy 9–10 yrs. Girl 11–13 yrs.	40	35	40	35	2500
Moderately active women; boy 11–12 yrs. Girl over 13 yrs.	45	40	45	40	2500 2800
Very active woman Active boy 13–15 yrs.	65	50	75	75	3000 3200
Active boy over 15 yrs.	70	55	115	115	3800
Man—moderately active	70	60	75	75	3000
Man—very active	80	65	115	115	4500
Sedentary man					2500
Woman—pregnant					2500
Woman—lactating					3000

Source: Stiebeling and Ward, *Diets at Four Levels of Nutritive Content and Cost*, U.S.D.A. circular No. 296. Nov., 1933.

Calorie Requirements from Committee on Food and Nutrition of the National Research Council *Recommended Dietary Allowances*, May, 1941

elimination of sugar would be possible without injurious nutritional effects by providing the calories derived from sugar with other foods of highly concentrated calorie value (e.g., wheat and grain products, potatoes, fats).

The diets from which these sugar requirements have been taken roughly represent optimal diets at different levels of food expenditure. It is noteworthy that the relationship between sugar consumption and income is hardly a straight line with positive slope. Ignoring the emergency diet which represents a sacrifice of nutritional needs temporarily to satisfy energy requirements, there is a really sharp increase in recommended sugar consumption at higher income levels only for very active types of individuals.

Activity appears to be of prime importance in determining different calorie and so different sugar needs of adults. Table 4 indicates that a man whose occupation involves a great deal of activity requires 33 per cent more calories than a moderately active man, and it is suggested that a substantial part of this be filled by increased sugar consumption. Failure to provide our key workers with their calorie requirements must inevitably impair their capacity for work, and in a relatively short period. Extra rations to laborers engaged in armament production as suggested earlier[14] may well be appropriate in the case of sugar.

5. *Conclusions*

The principal conclusions suggested by the foregoing analysis may be summarized as follows:

With respect to rationing foodstuffs in general:

1. Rationing groups of related commodities is apt to yield more satisfactory results than rationing these items individually, while at the same time eliminating considerable administrative difficulties connected with adjusting rations of special groups of people.
2. An equitable rationing system may have to be accompanied by some form of subsidization of low income families to enable them to purchase the assigned rations.
3. Assigning the same rations to children as to adults may be justified as a means of protecting our children from the deprivation that war may force on the adult population.

[14] Supra p. 655.

4. Local boards should be empowered to allot extra rations to individuals upon physician's orders.
5. Extra allotments should be available to war workers where essential to maintain their working efficiency.

With respect to sugar rationing:

1. Equal per capita rations of sugar do not make adequate allowance for variations in consumption habits in different areas and especially as among urban and farm people.
2. The fact that groups with low sugar consumption tend to rank high as consumers of sugar products and vice-versa suggests that a more equitable rationing pattern would be achieved by establishing a single ration for sugar and sugar products.
3. This would not only make allowance for the different habit patterns of different individuals, but would also enable people who have done considerable home canning to continue to do so.
4. In the apparently remote event that the fats and oils shortage in conjunction with the sugar deficiency should threaten the satisfaction of the calorie requirements of armament workers, additional rations should be allotted to them.

NOTES

ECONOMIC ASPECTS OF ARTIFICIAL INSEMINATION OF COMMERCIAL DAIRY COWS*

ARTIFICIAL insemination associations for commercial dairy cows have been organized in a number of states during the past few years. Thus far this new development has not reached a point where it has had an appreciable economic effect on either producers or consumers of dairy products. However, the widespread interest that has been expressed and the rapid rate of expansion that has taken place suggest that it may become one of the important changes in production technique with respect to farm animals during the next few years. Cows were milked on 77 per cent of the farms of the country in 1934, so that a change in technique that affects the dairy industry may have far-reaching consequences. It is the objective of this paper to direct attention to some of the factors that will influence future developments and to some of the economic effects that may be expected in the event that this practice is adopted by a considerable proportion of commercial dairy farmers.

The practice of impregnating animals by collecting the seminal fluid and injecting it into the uterus is not new. It is believed that Arab horse breeders used this method several centuries ago, and experiments were conducted successfully with dogs in 1780. It was practiced to a limited extent in the United States with purebred animals, especially horses, during the first decade of this century. Laboratory demonstrations with horses were not uncommon at midwestern agricultural colleges nearly thirty years ago. However, it is only during the past few years that the technique of artificial insemination was perfected to the point where it could be made available generally to livestock breeders. During recent years it has been used by an increasing number of private breeders of purebred beef and dairy cattle and to a lesser extent by purebred breeders of sheep and hogs. However, the practice was not adopted by commercial farmers, except to a limited extent with horses, until May 1938, when the Cooperative Artificial Breeding Association No. 1, Inc., was organized at Flemington, New Jersey.

* Paper No. 1987, Scientific Journal Series, Minnesota Agricultural Experiment Station.

Relatively little information has been made available regarding this new development. Consequently it was necessary to solicit the cooperation of specialists working in this field. Inquiries were addressed to animal geneticists or dairy and animal husbandry specialists in each of the forty-eight states. Much of the analysis presented in this paper is based upon the information and opinions supplied by these workers.

The replies indicate that only seven artificial insemination associations for commercial dairy cows were in operation in six states in 1938 (Table 1). By the end of 1941 the number of associa-

TABLE 1. GROWTH OF ARTIFICIAL INSEMINATION OF COMMERCIAL DAIRY COWS IN THE UNITED STATES, 1938–1941

	1938	1939	1940	1941
Number of states with associations	6	17	20	25
Number of associations	7	31	58	88
Number of herds in associations	537	2,678	5,413	11,655
Number of cows in associations	5,125	23,800	54,300	105,126
Number of bulls in associations	32	147	267	440
Average number of herds per association	77	86	93	132
Average number of cows per association	732	768	936	1,195
Average number of cows per herd	9.5	8.9	10.0	9.0
Average number of bulls per association	4.6	4.7	4.6	5.0
Average number of cows inseminated per bull	160	162	203	239

tions had increased to eighty-eight in twenty-five states. During this four-year period the number of cows served by these associations increased from five thousand to over one hundred thousand. The latter figure represents only about 0.4 per cent of the 25,000,000 cows two years old and over kept for milk. It is interesting to note that only about 0.4 per cent of the corn acreage harvested in the twelve corn belt states was planted to hybrid seed corn in 1934.

On the whole the most rapid development has taken place in concentrated dairy areas, although no associations were reported in some important dairy states and relatively few in others. About 82 per cent of the cows registered in the artificial breeding associations at the end of 1941 were in the states east of the Mississippi and north of the Ohio and Potomac rivers. Associations were in operation in all but three of the states in this area. On the other hand, active associations were reported in only nine states west of the Mississippi River and in only three states east of the Missis-

sippi and south of the Ohio and Potomac rivers. Wisconsin ranked first with 28,000 cows. New York ranked second, Maine third, Connecticut fourth, New Jersey fifth, Ohio sixth, and Minnesota seventh.

The replies of specialists in the field indicate wide differences of opinion as to probable future developments. They were asked to estimate the proportion of commercial dairy cows in their respective states that would ultimately be served by artificial insemination associations. Several replied that it was too early to make a definite commitment, and of those who submitted estimates several stated that it would no doubt be necessary to revise present estimates in the light of subsequent developments. Estimates that were submitted varied from 1 or 2 per cent to 60 per cent, the average being only slightly over 12 per cent. With one exception the estimates of 12 per cent or over came from workers in important dairy states, and for the most part these were the states in which the greatest development had already taken place. This suggests that the new technique may be adopted by a larger proportion of commercial dairy farmers than many specialists now consider likely.

Factors that will influence future developments include (1) the relative cost of the artificial and natural methods of breeding, (2) the relative convenience of the two methods, (3) the availability of proved sires, (4) the concentration of the dairy cow population, and (5) the attitude of dairy farmers towards herd improvement.

Many farmers are inclined to measure the relative cost of the artificial and natural methods of breeding chiefly in terms of the cost per calf at calving time and to ignore the long-run gains from the improvement in the genetic make-up of the dairy herd. Over three-fourths of the artificial insemination associations in operation in 1941 charged $5.00 per cow for this service plus a $5.00 membership fee for each herd owner. With few exceptions the $5.00 service fee per cow covered a maximum of three services, and an additional charge of from $1.00 to $2.00 was made for each service thereafter. Based upon figures submitted by twenty-five specialists, an average of 1.79 services per cow were required under the artificial breeding system compared with 1.74 services per cow in the case of natural breeding. These figures suggest that the total breeding charge per cow, except in the relatively few cases where more than three services were required, was $5.00 plus a proportionate share of the

$5.00 herd membership fee. As the herd membership fee is not a recurring charge, the proportion of this fee that is chargeable to each cow decreases as the number of cows in the herd increases and also decreases with the passing of time.

As shown in Table 1, the average number of cows served per herd registered in artificial breeding associations varied from 8.9 in 1939 to 10.0 in 1940. The average for the four-year period was slightly under ten cows per herd. It is probable that all of the cows in herds registered in the artificial breeding associations were not served through the associations. In some cases bulls were kept on the farms, and some of the cows were bred in the usual manner. However, on ten-cow farms where all of the cows were bred artificially, the annual breeding charge per herd owner was approximately $50.00 plus part of the $5.00 membership fee.

Estimates of the cost of maintaining dairy bulls on farms were submitted by specialists in twenty-seven states. The average of these estimates, which varied greatly from region to region and from state to state, was slightly over $95.00 per year. This represents an average service charge of about $9.50 per cow in a ten-cow herd.

The cost of natural breeding is not the same on all farms. For example, all dairy farmers do not keep dairy bulls. Those with few cows often obtain service at relatively low cost from bulls kept by neighbors. Furthermore, some farmers follow the practice of using young, untried bulls which gain in weight during the time they are kept in service. The gain in weight may be sufficient to cover a considerable part of the cost of maintenance.

It also is possible that the artificial breeding associations may find that the $5.00 service fee per cow and the $5.00 membership fee per herd owner are not sufficient to cover the salaries, travel, and other expenses of competent technicians and helpers, plus the original cost and maintenance of proved sires and of the young bulls that are being proved. If it is found that receipts from existing fees are not sufficient to maintain the association in a strong financial position over a period of time, it will be necessary to increase the service charges.

Based upon the service charges made by most artificial insemination associations during 1941 and upon the average of the estimates submitted on the cost of maintaining dairy bulls on farms, it is obvious that in small dairy herds the cost per calf at calving time

is less under the artificial insemination system than when mature bulls are kept and the cows bred in the natural manner. This advantage decreases as the size of the cow herd increases. As relatively small herds are common in many if not most areas, the reduced cost under the artificial breeding system should encourage increased participation in the artificial breeding program.

The relative convenience of the two methods also will influence future developments. Dairy cows are subject to constant observation, so that the heat period is readily detected. This is one reason why artificial breeding has been adopted more generally with dairy cattle than with commercial herds and flocks of beef cattle, sheep, and hogs. Natural breeding is a simple process where bulls are kept on farms. If the artificial method is to make a strong appeal to farmers, it is essential that this service be rendered without undue inconvenience. It is necessary that adequate communication facilities be available. In areas where farm homes are equipped with telephones no difficulty should be encountered on this score. The central headquarters can be notified without delay. The service should be supplied promptly by the technician in charge, and all farmers, regardless of the size of their herds, should receive equal treatment with respect to service from proved and unproved sires. Where adequate communication facilities are available and the service is rendered promptly, it would appear that the artificial method offers no serious problem from the standpoint of convenience. It is probable that many farmers would welcome the opportunity to dispose of their herd sires. Barn space, yard facilities, and the time required to feed and care for the herd sires could be released for other purposes. Furthermore, mature dairy bulls often become unruly and accidents are not uncommon.

The availability and cost of proved sires is another factor which will influence future developments. During recent years the United States Department of Agriculture in cooperation with state agricultural experiment stations has made a nation-wide search for superior dairy sires. These have been located through an intensive study of dairy herd production records. While many satisfactory sires have been located, it is probable that the number would be inadequate to satisfy the demands of a rapidly expanding artificial breeding program. It also would be necessary to prove young bulls so that adequate replacements would be available. It is evident that the service charge is a function of the cost of proved sires, and

the cost of proving young bulls as well as of the cost of maintaining the herd sires and the salaries, travel, and other expenses of the technicians and helpers.

Most animal geneticists and dairy husbandry specialists are of the opinion that a concentrated dairy cow population is essential to the successful operation of an artificial insemination association. The number of cows enrolled must be sufficient to provide adequate revenue to maintain the association, and the cows must be located within a reasonable distance of the central headquarters so that the local technicians can render prompt service at reasonable cost in time and travel. The average of twenty-three estimates as to the minimum number of cows required in separate associations was 1065, and estimates of the maximum number that could be served by one local association varied from 1500 to 5000. As shown in table 1, an average of 1195 cows were served by associations in operation in 1941. One technician can serve 1200 to 1500 cows, so that additional technicians are required in the larger associations. The estimates suggest that the desired maximum distance for effective operation is less than twenty miles and the maximum practical distance less than thirty miles. It is apparent that the dairy cow population in many areas will not support the type of insemination association that is most common in this country at the present time.

However, it is possible that large associations, or a federation of several local associations, embracing several counties or perhaps an entire state, may replace the typical local association. This development is now under way in Wisconsin, Minnesota, and New York. One association in northeastern Wisconsin serves 9000 cows in seven different counties. Twenty sires are kept at the central headquarters, and the semen is sent to six veterinarians located in the centers of cattle population in these counties. This type of organization has been so successful in Wisconsin that it is replacing the typical 1200-cow local association. A similar development is now taking place in Minnesota. Experience in New York state with a centralized organization suggests that semen can be sent from the central station to practically all parts of the state. It is believed that 100,000 cows may be served from central headquarters and that local associations, if affiliated with the central, may be operated successfully with as few as three hundred cows. Further developments along this line may make artificial insemination

practical in areas where the cow population is not as concentrated as in the leading dairy states.

The attitude of dairy farmers towards herd improvement will have an important bearing upon the future of the artificial insemination program. The possibilities of improvement through better breeding, feeding, and management have been demonstrated over a period of years. Results of breeding experiments conducted at various experiment stations have been reported from time to time. Dairy herd improvement work has been in progress throughout the country for many years. The failure of the average dairy farmer, who customarily raises his own dairy replacements, to strive for greater improvement in the past may have been due to the fact that he did not have access to or could not afford the services of a superior sire, to his failure to appreciate the improvement that could be effected through the use of a superior sire, or to the time that must elapse between the time cows are bred and the time production records of the resulting heifers can be obtained. The artificial insemination association removes the first limitation by making available the service of superior sires at reasonable cost. The influence of various extension agencies as well as the influence of the artificial breeding associations now in operation may be expected to lead to the more general appreciation of the possibilities of herd improvement through the use of superior sires. This should stimulate increased interest in the artificial breeding program.

A number of significant economic consequences may be expected to flow from an expanded artificial insemination program. These include: (1) a reduction in the number of bulls on farms, (2) an increase in the number of dairy cows on farms where herd bulls are no longer required, (3) the adoption of improved feeding and management practices, (4) an improvement in the health and fertility of dairy herds, (5) an improvement in the genetic make-up of dairy herds, and (6) regional specialization in the raising of dairy heifers for replacements. Most of these factors point in the direction of an increase in the supply of dairy products. The rate and extent of the increase will depend largely upon the trends in the number of cows enrolled in the artificial breeding program and in the number of other cows kept for milk.

An effective artificial insemination association makes possible a sharp reduction in the number of sires required. As shown in Table 1, the average association in operation during 1941 kept slightly

less than five proved sires in service for the 1195 cows enrolled, or one sire for every 239 cows. The estimates submitted by twenty-four specialists as to the number of cows that could be served in a year by one sire under the artificial insemination program varied greatly, the average being about 500. Fewer bulls are required in local associations where the cows are all of one breed than where more than one breed is involved.

Most of the specialists were of the opinion that it would be necessary to test two or three young bulls to secure satisfactory replacements for each proved sire. According to these estimates, it appears that three proved sires and about six young, unproved bulls will need to be kept by a typical 1200-cow association, providing all of the cows are of one breed, and a somewhat greater number if more than one breed is involved. The average association served 132 herds during 1941.

It does not necessarily follow that 132 bulls were in service on these farms or that all of those in service could be replaced by the three proved and six young unproved bulls maintained by the association. It is probable that bulls were not kept on some of the smaller dairy farms and that more than one bull was kept on some of the larger farms. It also is probable that some of the cows in herds registered with the associations were not served artificially but were mated to bulls kept on the farms. However, it appears reasonable to conclude that the organization of a typical 1200-cow local association will make it possible to effect a reduction of 80–90 per cent in the number of bulls required. As most of the dairy bull calves that are not required for breeding purposes are sold as vealers, an expanded artificial breeding program would result in some increase in the supply of veal.

Dairy farmers who dispose of their herd sires will devote the released feed, barn and lot space, and labor to other uses. In some cases the released resources will be utilized by the addition of an extra cow in the dairy herd. If the additional cow is purchased by a member of a breeding association from a non-member, the output of milk and butterfat will be increased on the member's farm and reduced on the non-member's farm. In the short run, such a shift would have no effect on the total national output of dairy products other than that due to the kind of feed and care supplied by the new owner. However, in the long run it would lead to some increase in the number of cows on farms and hence in the total output of

dairy products unless it brings about a permanent change in the distribution among farms.

Participation in the artificial insemination program should lead to the adoption of improved feeding and management practices. It will be necessary for each herd owner to keep production records so that the productivity of dams and daughters can be compared. These records will reveal differences between cows in the same herd and betwen different herds. Contacts with the technician and with other farmers at association meetings also will tend to bring approved practices forcibly to the attention of the individual members. The adoption of improved practices would result in an increase in output of dairy products, and this influence will be felt over the short run as well as over the long run when the genetic composition of the herd is being improved through the continued use of superior sires.

Artificial insemination associations, under the direction of qualified technicians, should bring about an improvement in the health and fertility of dairy herds. Many diseases to which dairy animals are subject can be controlled more effectively if the animals receive the regular attention of trained veterinarians. The spread of disease through natural breeding would be checked. Shy breeders often respond to proper treatment. An improvement in the health and fertility of dairy herds would result in an increase in the output of dairy products through more efficient use of the available feed and labor. It also would reduce the cost of raising or buying replacements by prolonging the productive period of dairy cows and supperior sires.

The most important economic effect of the artificial breeding program will flow out of an improvement in the genetic make-up of dairy herds which results. To obtain information on the extent of improvement, the specialists were asked to estimate the percentage increase that might be expected if the average run of commercial dairy cows in their respective states were mated to proved sires and if succeeding generation heifers also were mated to proved sires. Several replied that sufficient data were not available to enable them to make worthwhile estimates. Others stated that the extent of the improvement would depend largely upon the foundation cows, that heifers from the average run of cows would show a marked increase in productivity but that relatively little increase could be expected in the case of cows with butterfat

records of 300 pounds or over, and that it would be increasingly difficult to maintain productivity as the dams approached 400 pounds butterfat. The average of the estimates submitted indicates a probable increase of 21 per cent in first generation heifers sired by proved sires and out of the common run of dairy cows; 10 per cent increase for second generation heifers; 5 per cent increase for third generation heifers; and over 2 per cent increase for fourth and succeeding generation heifers. An increase of 38 per cent is about twice the increase that can be obtained from the strains of hybrid seed corn now available, and the adoption of hybrid seed by commercial corn growers swept over the corn belt at a rapid rate during the latter half of the 1930's.[1] It also is about three times the increase in productivity that can be obtained from the crossing of existing breeds of swine.[2] Hog salesmen at the leading markets estimated that the proportion of crossbred hogs received at these markets increased from about 45 per cent in 1931 to over 70 per cent in 1941.

It is not anticipated that the artificial insemination program will exapand as rapidly as the use of hybrid seed corn. The increased output due to hybrid seed is obtained within a few months after the seed has been planted, while the increase in productivity arising from the use of proved sires cannot be determined for a considerable period of time. From three and a half to four years must elapse from the time a cow is bred until the heifer completes her first lactation period. Furthermore, some commercial diary farmers follow the practice of selling all calves as vealers and of buying their dairy cow replacements. A much larger proportion sell all or most of the bull caves and some of the heifer calves as vealers. The benefits of increased productivity arising out of the use of improved sires are limited to the heifers that are retained for dairy herd replacements or additions and to the bull calves that are retained for breeding purposes. The organization and operation of an artificial insemination association also call for cooperation among farmers and a cooperative attitude on the part of officers and technicians in charge.

Some of the cows in herds owned by members of the artificial

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[1] A. A. Dowell and O. B. Jesness, "Economic aspects of hybrid corn," JOUR. FARM ECON., Vol. XXI, No. 2, May 1939, pp. 479–488.

[2] L. M. Winters, O. M. Kiser, P. S. Jordan, and W. H. Peters, "A six years' study of cross breeding swine." Minn. Agr. Expt. Sta. Bull. 320, 1935.

insemination associations would need to be mated to the young bulls that are being proved, and the heifers sired by these bulls would not be as productive on the average as heifers sired by proved bulls. Each young bull should be mated to fifty cows or more scattered over several herds, then retired temporarily to the central headquarters or leased to a dairy farmer until the daughters have completed their first lactation period. The best of the young bulls would then be returned to active service in the association and the less desirable bulls sold for beef.

If the estimates of increased productivity are reasonably accurate, it is clear that the artificial breeding program will lead to an increase in output of dairy products on the farms of those who participate. The increased productivity due to the improvement in the genetic make-up of dairy herds will reduce production costs. During the early stages of development the gains from increased productivity will accrue largely to those who adopt the new technique. However, if the program is adopted by a considerable proportion of dairy farmers, the gains will be shared with consumers in the form of increased supplies and lower prices. The reduction in prices for dairy products would fall upon all dairy farmers, those who enjoy reduced costs due to increased productivty and those who fail to improve the genetic make-up of their dairy herds. Thus, high cost producers would be under pressure to reduce costs by adopting the new technique or perhaps to seek alternative uses for available resources.

Regional specialization in the raising of dairy heifers is likely to be stimulated if the artificial breeding program becomes general. There would be a tendency for a larger proportion of dairy producers in deficit feed areas to buy dairy herd replacements from areas where feed supplies are abundant. Those who cater to the whole milk trade, both in deficit feed areas and in city milk sheds near surplus feed areas, also would be inclined to dispose of calves at an early age and buy replacements for their dairy herds. Buyers would be able to purchase bred heifers in carload lots through the artificial breeding associations. Such purchases could be made with reasonable assurance that the heifers not only were free from disease but that their genetic make-up would insure satisfactory production. Since artificial insemination is better suited to intensive dairy areas than to extensive areas, the general adoption in intensive areas will tend toward greater concentration of dairying in

such areas and to increase the comparative disadvantage of other areas.

Exact figures on the per cent of dairy cows that are discarded each year due to all causes including accidents, disease, age, or unsatisfactory production are not available. Estimates of specialists in thirty-two different states varied from 10 to 33⅓ per cent. In general, the lower estimates were submitted by workers in some of the western and southern states, while the higher estimates were submitted by workers in the concentrated dairy areas. The average of all estimates was over 21 per cent. If it can be assumed that 21 per cent of the 25,000,000 dairy cows of the country are discarded each year, it follows that 5,250,000 heifers are required each year to maintain the dairy cow population. On the basis of normal distribution between male and female calves and the usual losses from death and culling, it would be necessary for more than one-half of the dairy cows of the country to be included in the artificial breeding program if all replacements came from this source. However, it is probable that the proportion of dairy cows discarded because of disease, lack of fertility, and unsatisfactory production would be reduced as a result of the change in technique.

It is too early to reach final conclusions as to the future of the artificial insemination program. Consequently it is not possible at this time to submit worthwile estimates as to the long-run effect of the program on the total milk supply of the country. However, it seems clear that if the current rate of expansion continues over a period of years, it will have far-reaching consequences both to producers and consumers of dairy products. Some of these effects would be felt rather promptly, but the cumulative effects of an improvement in the genetic make-up of dairy herds would appear gradually over a period of time. This would permit the necessary regional and interregional adjustments to be made in an orderly manner.

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THE IOWA STATUTORY PROVISIONS FOR AUTOMATIC LEASE RENEWAL[1]

IN RECENT years commissions have been at work in several states, studying problems of farm tenancy. Their investigations have been followed by recommendations for legislative action "and State Legislatures have begun to put commissions' findings into law."[2] These events are indeed of good omen: they are at least an indication of widespread interest in the problems of tenancy and perhaps warrant the hope that better days might be in store for landless classes.

Nothing however could work more harm to the tenant groups than to overestimate what has been accomplished. The significance of a legislative provision should be carefully studied to determine whether or not there is any need for further legislation. To appraise legislation at the time of its enactment or shortly thereafter is indeed difficult. Among other items, information concerning the actual enforcement of the law is needed. Moreover the attitude of the courts in regard to the constitutionality, the interpretation and the application of the provision is unknown.

With the above limitations in mind, it still appears to be the task of the economist and the sociologist to appraise newly enacted legislative provisions, to indicate their social and economic significance and to forecast their achievements. This paper is designed as an attempt to appraise a recent development in the field of farm tenancy legislation, namely, the recently enacted provisions of 1939 Legislature of Iowa on the termination of farm tenancies.

The Iowa Statutes of 1939 include the following regulations concerning the landlord-tenant relationships:

"10159. *Tenant at will—Notice to Quit.* Any person in the possession of real estate, with the assent of the owner, is presumed to be a tenant at will until the contrary is shown and thirty days' notice in writing must be given by either party before he can terminate such a tenancy; but when in any case, a rent is reserved payable at intervals of less than thirty days, the length of notice need not be greater than such interval.

"10160. *Termination of Farm Tenancies.* In case of tenants occupying and cultivating farms, the notice must fix the termination of the tenancy to take place on the first day of March, except in the case of mere croppers,

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[1] The author gratefully acknowledges the help and advice of Mr. Maurice Rothberg, Department of Rural Sociology, N. C. State College.

[2] State legislation for better land use. A special report by an Interbureau Committee of the United States Department of Agriculture, Washington, 1941, p. 45.

whose leases shall be held to expire when the crop is harvested; if the crop is corn, it shall not be later than the first day of December, unless otherwise agreed upon.

"10161. *Agreement for Termination.* Where an agreement is made fixing the time of termination of the tenancy, whether in writing or not, it shall cease at the time agreed upon without notice. In the case of farm tenants, except mere croppers, occupying and cultivating an acreage of forty acres or more, the tenancy shall continue for the following crop year upon the same terms and conditions as the original lease unless written notice for termination is given by either party to the other not later than November first, whereupon the tenancy shall terminate March first following; provided, further, the tenancy shall not continue because of absence of notice in case there be default in the performance of the existing rental agreement.

"10162. *Notice—How Served.* When a tenant cannot be found in the county, the notice above required may be given to any subtenant or other person in possession of the premises, or, if the premises be vacant, by affixing the notice to any outside door of the dwelling house thereon, or other building, if there be no dwelling house, or in some conspicuous position on the premises, if there be no building."

The nature of the provisions listed above is quite evident: the Statutes provide for automatic renewal of the lease of agricultural holding, when no notice is given prior to November 1 that is four months before the end of the lease. It is thus a measure designed to give more security to farm tenants. Some authors, however, apparently interpret the automatic renewal clause as a measure directed toward the increase of stability of tenants. For instance, Paul V. Maris deals with this provision under the section "Long-term Written Leases" of his study on farm tenancy.[3] The authors of *State Legislation for Better Land Use* consider the Iowa provisions among the "legal forms encouraging tenancies of longer duration."[4]

That the requirement of a notice, within certain limits of time, might bring about longer duration of tenancies, seems, indeed questionable. The only ways in which such a requirement might promote longer leases seems to be the following: (a) The landlord forgets to serve notice or is not aware of the legislative provisions. Such cases cannot be expected to occur too frequently and hardly twice for the same landlord.

(b) The tenant is able to prove that he has not received a notice. This would hardly be possible under 10162, which provides for an action, that might be called *in rem.*

[3] P. V. Maris, Farm tenancy, Yearbook of Agriculture, 1940, p. 904.
[4] Op. cit., p. 45.

(c) The cost of serving the notice is so high that the landlord will abstain from serving it unless he expects to offset this cost by gaining from the assumption of new tenants. Again the provisions of 10162 make this event extremely improbable.

(d) In one respect only may the new provisions for the termination of tenancies lead to greater stability of tenants. The time interval between the serving of notice and the termination of leases, is increased from one to four months in the new Statutes. The tenant is thus granted more time for negotiations with the landlord and for finding other alternatives: his bargaining power is therefore enhanced. Under certain conditions the landlord might be expected to make allowance for the improved bargaining position of his tenants and be less willing to serve notice. For this reason, some improvement in the stability of tenant-landlord relationships might be expected to occur from the enactment of the automatic renewal clause.

The effects of a uniform date for the termination of tenancies need not be considered here, since the new Statutes represent no improvement, in this respect, upon the already existing statutory provisions that fixed such a date on the first of March.[5]

The nature of this legislation is then similar to those provisions of common law and statutes which give the tenant the right to hold over in lieu of emblements, when no limits are fixed for his tenure. Such right is granted when there is conveyance of title or when no notice is served prior to a certain term.

To determine how much improvement upon the common law and the statutes of other states is achieved by the Iowa Statute, insofar as the security of tenants is concerned, the following questions will be answered: To what kind of tenancies does the provision apply? And then: How valuable is the clause for these types of tenancies?

A study of this nature has been undertaken by the author of an unsigned note—Termination of Agricultural Tenancies, which appeared in the *Iowa Law Review*. The note is a valuable source of information as to the background of the legislation, the various proposals and the intentions of the commission.[6] Unfortunately, however, it gives an interpretation of the bill which is open to many

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[5] Iowa Code, 1935: 10160.

[6] Termination of Agricultural Tenancies, The Iowa Law Review, Vol. 26, 366.

criticisms and exceptions: some of them seem so important as to alter, in a significant manner, the value of the provisions as claimed by the author.

It should be emphasized here that legislative provisions affecting agricultural holdings should be separated from legislation on urban holdings. It is not altogether necessary to develop a special theory of the nature of tenure in agricultural holdings or to speak of a farm as being a "going concern"—referred to by the Romans as a *taberna instructa*—in order to justify this attitude.

The following points seem to warrant a separate treatment of agricultural leases:

1. The object of lease in farm tenancy is an instrument of production, while in urban tenancy we are mostly concerned with a consumption good, a residence.

2. In deciding cases of farm tenancy, technical aspects might be involved, with which a court might not be familiar. Questions of what is the best use of land, what is deterioration of land, what constitutes mismanagement, etc. are more technical than legal in nature.

3. Inequality of bargaining power between the parties is more frequent in farm leases than in urban leases. Circumstances that might cause unequal bargaining power in urban leases—for instance the overcrowding of an urban area—are also more apparent and have already been taken care of by legislation in several states.

4. When urban and rural leases are dealt with under the same title, there is the danger of adopting regulations that might not be justified for both types of leases. Restrictions on the freedom of contracts might be justifiable under the general welfare clause for rural and not for urban leases. The constitutionality of the whole act can thus be challenged by urban interests.

In The Iowa Statute, an attempt has been made to provide special regulations for farm tenancy. The attempt, however, is somewhat incomplete and this has resulted in a degree of obscurity. While there are specific provisions for farm tenancies, both classes of leases are dealt with under the same section.

In regard to the various types of tenancies it should be stated that the provisions do not apply to tenants at will, for which only a thirty days' notice is required under 10159.[7] The status of tenants

[7] See *Iowa Law Review*, Vol. 26, p. 372.

at will is, in fact, significantly impaired since the new provisions offer them less protection than the 1935 Code.[8]

It is doubtful whether or not the provision applies to hold-over tenants: these tenants are considered in Iowa as tenants at will since they can be said to be "in the possession of real estate with the assent of the owner."[9] The author of the note on "Agricultural Tenancies" expresses the hope that the courts will give a different interpretation of the law and also extend the benefits of 10160 and 10161 to hold-over tenants.

It follows then that the statutory provisions of 10160 and 10161 apply to year-to-year tenants and that, if the courts were to agree to a broad and new interpretation of the law, they would also be applicable to hold-over tenants. Our discussion will then be confined to these two groups.

Section 10160 specifically refers to farm tenancies and requires that the notice fix the termination of leases on the first day of March, except in the case of croppers. Section 10161 concerns the "agreement of termination: where an agreement is made fixing the termination of the tenancy, whether in writing or not, it shall cease at the time agreed upon without notice. In the case of farm tenants . . . the tenancy shall continue for the following crop year" unless written notice is given.

A question arises immediately: does the first sentence of 10161 refer only to urban tenancies? If so, why is this clause inserted among provisions on farm tenancies? One might doubt whether or not this clause is inserted to modify 10160, that is to make 10160 applicable only in the absence of agreements. Indeed it seems strange that the legislator should fix a definite term for farm tenancies, depriving the parties of the liberty of fixing other dates for the termination of leases. The first sentence of 10161 seems to restore this liberty.

If such an interpretation be acceptable, 10160 would merely regulate the termination of tenancies in absence of any agreement thereon. When no agreement is entered in connection with the end of the lease, the contract is held to terminate on March 1 and the

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[8] "The present Iowa statute remains unchanged with the exception that it now requires a notice of thirty days rather than a notice of three months to terminate a tenancy at will." *Iowa Law Review*, Vol. 26, p. 79.

[9] Iowa Code 10159. See also German State Bank v. Herron, 111 Iowa 25, 82 N.W. 430 (1900), and O'Brien v. Troxel 76 Iowa 760, 40 N.W. 704 (1888).

requirement of notice becomes effective. The automatic renewal clause will then be traceable to the provisions of common law for holding out in lieu of emblements and the four months' notice might be considered an improvement upon the vague terms of other statutes. Some of the statutes, however, can be held as giving an approximately equal amount of time, in case of undetermined leases.[10]

The author of the note on Agricultural Tenancies, on the other hand, seems to hold the opinion that 10161, in its first part, refers to urban leases only. It follows then that 10160 fixes a date for the termination of farm tenancies, regulating them not only in the absence of all agreements but also when different provisions have been set up between the parties.[11]

This interpretation seems somewhat arbitrary. At first one fails to see how such a restriction of freedom of contracts could be justified. One wonders what public interest would be served by terminating farm leases at a specific date, for all farms in the state. Indeed it would not be difficult to find cases in which another date of termination could be more advisable. Secondly, it might be said that legislation on contracts is usually permissive in nature; it regulates contractual relations in the absence of agreements or when their significance is doubtful. One might at least expect the courts to hold 10160 as a section to be invoked when no date for the termination of leases is fixed or can be said to be fixed by the contract.

Even if the above interpretation were accepted, it still does not follow that, under 10160 and 10161, the parties are prevented from agreeing upon a shorter period of notice or upon no notice at all. The note (in the *Iowa Law Review*) contends that courts might be expected to hold those agreements as not binding. It is admitted, though, that the lease might be terminated even without notice by consent of both parties.[12]

The question could then be raised as to whether or not the time at which such a consent of the parties is obtained has any significance. If the parties are allowed to discontinue their relationship, if they so wish, even when no notice has been given, why should it not be legal for both parties to reach such an agreement before the

[10] N. C. Code 2347, 2354.
[11] *Iowa Law Review*, Vol. 26, p. 376.
[12] *Ibid.*, p. 375.

time fixed for the serving of notices? Carrying the case to an extreme: why should the parties not enter a binding agreement to do without notice or to shorten the time required for giving a notice?

A court that would hold as binding an agreement to surrender the right to notice will have many more cases upon which to base its decisions than if it were to decide in the opposite sense. When the legislator intended that agreements which deprive a party of certain rights should be held as not binding, it has been the constant practice to state so in the law, just because of the permissive nature of legislation on contracts.[13] Whatever the intentions of the legislator, the insertion of a clause making agreements to the contrary not binding seems at least advisable.[14]

Moreover, if a different interpretation were acceptable and courts were thus to rely more on the spirit than on the letter of the law, and were to judge the question *de novo*, there is nothing in the Statutes that might prevent the landlord from giving notice even if he has no intention to interrupt the relationship. Figures quoted in the *Iowa Farm Economist* merely warrant the conclusion that more notices were served after the enactment of the legislation than before, but do not indicate a decrease or increase in security.[15]

If this is the case, one cannot expect an increase in security from the adoption of the automatic renewal clause. Notices will be served to either party independently of the intentions of the other party. The continuation of the lease would then be made to depend upon the reaching of new agreements. The serving of notices would become a mere formality and give no indication of the intentions of either one of the parties.

Is there anything then in the automatic renewal clause which deserves consideration? The only features of the statutes that might be of some value are the fixing of a termination for undetermined leases as well as the granting, for these leases, a longer

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[13] For instance the N. C. Statute on "charges on advances to tenants" explicitly states that "no agreement or understanding between the parties shall work an estoppel against the person to whom supplies have been advanced" from showing that overcharges have been made (C.S. 2484). Similar provisions are often found in the statutes.

[14] The importance of making tenancy legislation mandatory rather than permissive is emphasized by Marshall Harris in Legal aspects of land tenure, JOUR. FARM ECON., Vol. XXIII, No. 1, p. 173.

[15] Iowa Farm Economist, Vol. VII, No. 9, pp. 11–14.

period of notice than is customarily found in common law and in the legislative provisions of several states. This provision might be expected to result in a decrease of undetermined leases and in their conversion into leases with a fixed termination. It is also possible that for year-to-year leases, the courts will hold that a 4-month notice is required.

According to R. Schickele, after a first year, in which notices were generally served "insurance companies, as well as private landlords, are living up to the spirit of the law quite well. In fact, there are one or two insurance companies which have adopted the policy of signing their leases already in September, more than a month in advance of the legal deadline."[16] It might also be hoped that, in line with the general opinion of farmers, legislative action might be taken in the future, to move the legal date for notice from November 1 to an earlier date.

These accomplishments are by no means negligible but certainly they cannot be said to promote much more stability or to increase the security of tenants to any large extent. While the efforts of the Iowa Tenancy Commission deserve consideration, in the opinion of the writer the action of the Iowa Legislature has little significance.

To conclude this appraisal, the automatic renewal clause cannot be expected to bring about improvements of a very significant nature. Other lines of attack, such as written leases, long-term cancelable leases, compensation for improvements, compensation for disturbance, suggest greater possibilities and are therefore to be recommended. Experience in England and in continental Europe has proved that these devices are effective contributions to the solution of the tenancy problem.

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[16] Private communication.

PEASANT FARMING IN INDIA

IN THE rural population of India there are large underprivileged groups. In distress both economically and socially they are commonly known as "backward classes." Their chief characteristic is their extreme poverty which has long been the enigma of those working for their relief. Helpless, the local officers often have to record cases of death as due to "fever" or "unknown causes" but it is generally considered that death due to under-nutrition is relatively common.

Farm organization and rural life in the Broach District is similar to that of backward classes in other parts of the country. This district is located in western India near the Arabian Sea, 200 miles north from Bombay. With climate tropical, crop production depends upon the monsoon rains which normally fall during June, July, and August. The land is level to rolling. Chief soil types are black clay, suited to cotten, light muram and a very small amount of sandy loam. The population of 334,170 is 20.6 per cent urban and 79.4 per cent rural.

Land Tenure

Farms are typically small when measured by American standards. Of 192 farms studied by the author the largest farm had 37½ acres, the average 12.6 acres, and the smallest 2 acres; 62 per cent of the farms were in a group ranging from 5 to 12 acres. Thirty-six per cent of the land under review was farmed by the owners and 64 per cent by tenants. Of the land owned by the operators, 70.9 per cent was mortgaged. Mortgagors saw little hope of ever recovering it.

Among the 192 operators, 41 owned all the land that they farmed, 62 were part owners, and 89 were tenants. The average size of farm for owners was 13.5 acres, for part owners 12.8 acres, and for tenants 12.0 acres. Of the land rented, 20 per cent was for cash and 80 per cent was on a crop share basis. Formerly crop share renting meant a 50-50 division. In recent years the tenant ig generally asked to pay one-half the land revenue also. Men who can afford the added risk prefer cash renting. Tenants believe it is less subject to rackrenting and other abuses than sharing crops. Recent Government policy favors renting for cash. Renting is on a one-year basis and a written lease is generally used. Eighty per cent of the farmers believe that the amount of rent paid by tenants

is increasing, giving as reasons tenant participation in the payment of revenue and additional services required by landlords.

The farmer is handicapped by small and scattered holdings. The average farm even though small was scattered in four different places. The average distance traveled by farmers in order to reach their fields and return home by the shortest route was 2.9 miles. While farmers see the disadvantages of scattered land holdings, their attachment to ancestral fields makes consolidation difficult. In the Punjab some progress has been made in the consolidation of holdings by cooperative methods. Through mutual exchange, purchase and sale members may eventually get most of their land in a single block.

The procuring of sufficient land on suitable terms probably constitutes their most serious problem. While the average farm contained 12.6 acres, according to statements of the men they needed at least an 18.5 acre farm unit. There are relatively no credit facilities available to the men in this group for buying land. The only source of credit they knew was the moneylender with a 12 per cent rate of interest.

Production of Crops

Fifty-two per cent of all land was devoted to cotton, which constituted 58.8 per cent of the total income. The average yield of cotton was 7.4 maunds (296 lbs.) per acre, and the average income per acre was Rupees 24–12–0.[1] The lowest yield of cotton was 4 maunds and the highest yield, 12½ maunds. Income per acre for seed cotton sold was Rs. 14–8–0 and Rs. 43–10–0, respectively.

Grain sorghum occupied 35.7 per cent of the land. The average yield was 15.4 maunds per acre and the value, Rs. 16–6–0. The highest yield was 30 maunds per acre and the lowest, 9 maunds. Value per acre was Rs. 30–10–0, and Rs. 9–11–0 per acre, respectively. Pigeon peas and other legumes grown both alone and as mixed crops represented 7.8 per cent of all crops.

In a general way farmers aim to follow a rotation of cotton two years and grain sorghum one year. The farmer often considers certain fields to be "cotton soil" and others "sorghum soil." In such cases there is little or no rotation. On the other hand, we found notable examples of careful rotation, with legumes shifted

[1] 1 Maund = 40 lbs. There are 16 anna to the rupee and at normal exchange the rupee is worth $.30.

from one plot to another each year. It is significant that the Indian peasant had observed that a legume crop growing is helpful to another crop, long before soil chemists had discovered the scientific basis for it.

Of the 192 farmers 93 used manure pits to a certain extent at least. From the 715 head of cattle on all farms 744 cartloads of manure were preserved and used. One farmer who pitted manure and trash more carefully than the others had nine cartloads for use on his fields. Had all done as well as he, there would have been in all, 3,217 cartloads of manure available. According to records

TABLE 1. ACREAGE OF DIFFERENT CROPS GROWN

Crops	Total Acreage	Percentage of Land	Total Mds.	Average Yield Per Acre
Cotton	1,267.5	52.1	9,445.5	7.4 Mds.
Sorghum	868.0	35.7	13,379.0	15.4 Mds.
Legumes alone	45.2	1.9	516.0	11.5 Mds.
Mixed crop	212.0	—	2,243.0	—
Rice (alone)	9.8	.4	168.0	17.0 Mds.
with cotton	197.0	—	1,427.0	—
Millet	28.0	1.2	259.0	9.25 Mds.
Wheat	16.0	.7	176.0	11.0 Mds.
Hay	55.2	2.3	48,000 (bundles)	875.0 (bundles)
Pasture and land not suited to cultivation	143.3	5.7	—	—

kept on the Vocational Training School Farm, this amount of manure applied to the soil would normally have resulted in increased crop yields worth approximately Rs. 16,085–0–0. Due to the scarcity of wood a certain amount of manure is dried for use as fuel but our associates estimated that the amount of manure wasted exceeds the amount used as fuel.

Several of the men had begun the use of Sann Hemp as green manure. We are convinced from observation and experience that this is at present the most hopeful solution for the problem of soil fertility. With an adequate use of hemp there is much less need for concern about the manure used as fuel. Steps for the improvement of crop yields are within reach of most cultivators in this class: (1) More adequate manuring; (2) larger acreage of legumes grown; (3) more thorough tillage; (4) increased attention to erosion; and (5) a closer balance maintained between crop production and livestock husbandry. The present system of farming based largely

on the production and sale of cotton and grain can under existing circumstances lead only to further soil depletion and decreases in crop yields.

Livestock

Given capital at a moderate rate of interest the farmer's greatest hope lies in improving the quality of his livestock.

Oxen are the only source of farm power. A good yoke of oxen can do a satisfactory job of tillage even with native implements but over half of the oxen for the farms under review were too weak and small to do satisfactory work.

TABLE 2. CAPITAL INVESTMENT IN LIVESTOCK FOR THE 192 FARMS

Kind of Livestock	Total Value	No. of Units	Value per Unit	Average Value Per Farm
Oxen	Rs. 18,962	434	Rs. 43-10-0	Rs. 98-12-0
Cows	4,682	220	21- 4-0	24- 5-0
Buffaloes	2,949	61	48- 5-0	15- 5-0
Goats	745	190	3-14-0	3-14-0
Chickens	586	475	1- 3-0	2-15-0
Total	Rs. 27,924			Rs. 145- 3-0

Cows are valued mainly for the oxen they may produce. Milk production is of secondary consideration. Due to lack of feed many are barren. It was common to find cows 7 to 8 years old which had never given birth to a calf. There is a marked deficiency of milk. In one backward class village having a population of 794 only 32 pints of milk were consumed daily. This would allow about 3/4 oz. per capita. In a survey of 320 school children in eight different villages, less than 2 per cent received any milk to drink. With no substitute for milk available the level of nutrition, especially among the children of this group is deplorably low.

A notable beginning toward the improvement of draft oxen in the area has been made both by Government and by private agencies. Premium stud bulls are in such instances supplied to villagers at nominal cost for the purpose of breeding up the local herds. So far the efforts have been too scattered and sporadic in nature to permit satisfactory results. For success it will be essential for all agencies to coordinate their efforts and work intensively over a long period of time.

The Farm Income

In computing the farm income the farmers were grouped as op-

erators, part owners and tenants. Income for all farms was computed on the basis of both farm income and labor income. Due to the wide variation and unsettled conditions in regard to interest rates farm income was considered the more appropriate measure.

As might be expected, farm income depends chiefly upon the size of the farm unit. In addition to money income the owner-operated and tenant farms contributed fuel, milk and eggs, grain used prior to harvest time, vegetables and tobacco worth Rs. 34–8–0 and Rs. 29–0–0, respectively.

For the tenant farms only two had incomes of Rs. 200–0–0 or more. Thirty-six had farm incomes between Rs. 25–0–0 and Rs. 79–0–0. The economic condition of the average tenant farmer is little better than that of a day laborer.

TABLE 3. SUMMARY OF RECEIPTS, OPERATING EXPENSES, AND INCOME FOR 41 OWNER-OPERATED FARMS

Items	Average 10 High Income Farms (20.4A)	Average 10 Low Income Farms (7.8A)	Average All Farms in Group (13.5A)
	Rs.As.Ps.	Rs.As.Ps.	Rs.As.Ps.
Cash receipts	429-10-0	112- 9-0	241- 5-0
Operating Ex.	211- 8-0	72-12-0	120-15-0
Inventory change	+41- 5-0	— -12-0	+8-10-0
Farm income	259- 7-0	39- 1-0	129- 0-0
Interest on investment	246- 3-0	85- 8-0	140-13-0
Labor income	13- 4-0	−46- 7-0	−11-13-0
Value of food grain stored for home consumption	75- 0-0	33- 4-0	42- 4-0*

* As far as possible, the farmer aims to set aside at threshing time a supply of grain for family use as food during the year. These amounts were calculated in each case and the value of grain set aside is shown here parallel with the farm income. These same amounts will be shown again in a later chapter where we give also the value of fuel and other articles which the farm contributes toward the family living.

TABLE 4. SUMMARY OF RECEIPTS, OPERATING EXPENSES, AND INCOME FOR 90 TENANT FARMS

Items	Average 10 High Income Farms (23.2A)	Average 10 Low Income Farms (8.3A)	Average All Farms in Group (12.0A)
	Rs.As.Ps.	Rs.As.Ps.	Rs.As.Ps.
Cash receipts	302- 8-0	80- 4-0	130- 0-0
Operating Ex.	160- 3-0	78- 8-0	84- 5-0
Inventory change	+21-15-0	+1-10-0	−2-10-0
Farm income	164- 4-0	3- 6-0	43- 1-0
Interest on Investment	37-10-0	10- 4-0	15- 0-0
Labor income	126-10-0	−6-14-0	28- 1-0
Value of food grain stored for home consumption	52-12-0	24- 0-0	32- 0-0

Tenant farmers depended on cotton for 75 per cent of their cash income, and on livestock products for only 6.5 per cent. It is generally the land owner who insists on growing more cotton. Left to themselves tenants would likely develop more of a subsistence type of farming.

The best managed farm consisted of 12½ acres, of which 7½ acres were owned and 5 rented for half share. Yields of cotton were 12½ maunds per acre and of grain sorghum 26 maunds. There was a farm income of Rs. 223–0–0. Rs. 82–0–0 were received from the sale of milk and eggs. In addition to cash the farm contributed products worth Rs. 93–0–0 to the family living.

TABLE 5. DETAILS OF RECEIPTS AND OPERATING EXPENSES FOR 89 TENANT FARMS

	Average 10 High Income Farms	Per Cent	Average 10 Low Income Farms	Per Cent	Average All Farms in Group	Per Cent
Sources of Income:	Rs.As.Ps.		Rs.As.Ps.		Rs.As.Ps.	
Cotton	221- 6-0	73.4	65- 2-0	80.7	97- 8-0	75.5
Grain sorghum	45- 4-0	14.9	1-10-0	2.4	15- 1-0	11.5
Legumes	11- 2-0	3.6	4- 4-0	6.0	3- 4-0	2.3
Small grain	3-10-0	1.2	5-11-0	6.4	3- 7-0	2.6
Hay and fodder	8- 0-0	2.6	0		2- 3-0	1.6
Livestock Prod.	13- 2-0	4.3	3- 9-0	4.5	8- 9-0	6.5
Total	302- 8-0	100.0	80- 4-0	100.0	130- 0-0	100.0
Operating Expenses:						
Rent	34- 4-0	21.9	9- 0-0	11.8	17- 4-0	20.8
Taxes and toll	22- 5-0	13.9	5-10-0	7.2	6- 8-0	7.8
Labor	30- 8-0	18.8	16- 4-0	20.9	17- 6-0	20.9
Seeds, etc.	8-15-0	5.6	9- 4-0	11.9	7- 8-0	8.9
Feed and misc.	20- 2-0	12.6	15- 8-0	19.3	13- 6-0	15.4
Farm equipment	25- 5-0	15.8	8- 4-0	10.6	13- 8-0	15.6
Livestock purchased	18-12-0	11.4	14-10-0	18.3	8-13-0	10.6
Total	160- 3-0	100.0	78- 8-0	100.0	84- 5-0	100.0

Indebtedness

The rates of interest paid by farmers varied from 9 to 36 per cent and averaged 16 per cent. Risk, custom, and moneylender-monopoly are the chief causes of high interest rates. Weddings, funerals, and household living expenses accounted for 66 per cent of the borrowing.

In an economy of indebtedness it is often difficult to state the

exact reasons for which money was borrowed. A small initial sum may be taken from the lender and this followed by subsequent borrowings from time to time until insolvency is reached. In the older debts, accrued interest is the major factor. But in every instance there would have to be a reason for the initial borrowing and we asked each farmer to state this as nearly as possible. The replies received are given below.

Reasons for Borrowing	Number of Replies	Percentage
Wedding expenses	54	33.4
Family living expense	42	24.7
Operating expense	23	14.1
Purchase of livestock	14	9.5
Funeral expenses	13	7.9
To pay for land	6	3.7
For building house	6	3.7
Education of children	5	3.0
Total	163	100.0

TABLE 6. INDEBTEDNESS BY TENURE OF OPERATOR

Tenure	No. of Farms	No. in Debt	Percentage of Farms in Debt	Average Amount of Debt	Total Amount
Owners	41	36	87.8	Rs. 423-	Rs. 15,228-0-0
Part owners	62	53	85.4	250-	13,250-0-0
Tenants	89	79	88.7	69-	5,451-0-0
Total	192	168			Rs. 33,929-0-0

While the average moneylender performs a useful service his

THE PURPOSE FOR WHICH LOANS WERE MADE IN A WELL-MANAGED COOPERATIVE CREDIT SOCIETY 1930–41

Purpose	Number	Amount
To pay off old debts	102	Rs. 20,703
To buy land	52	15,051
Farm operation	34	10,331
To build houses	37	8,706
Household expenses	10	600
For minor farm operations	4	400
For weddings	3	240
Total	242	Rs. 56,131

methods used and rates of interest charged are such as would hinder rather than help the development of peasant farming.

Loans made by the above society for the payment of old debts were used primarily for the redeeming of mortgaged land. In addition to this, 52 members were able to purchase 348 acres of land. Thirty-four were given loans for the purchase of livestock and farm equipment and thirty-seven built houses. While two-thirds of the borrowing with private moneylenders was for unproductive purposes, only 5 per cent of the loans made by this society were of that nature. Nearly two-thirds of all loans made by this Cooperative Society were used for the purchase or the redeeming of land,

Cooperative credit societies, despite some vulnerable points, merit further trial as a means for providing farmers with needed capital at moderate rates of interest and on favorable terms.

Level of Living

A committee consisting of two rural teachers and three farmers estimated that as a minimum, a family of husband, wife and three children would need Rs. 229–0–0 per year in order to live in decency. In practice families received only the following amounts:

Income Group	Amount of Farm Income Available For Family Living	Plus Grain and Other Products From Farm	Total for Family Living
Owner Operators	Rs. 70- 0-0	Rs. 76-12-0	Rs. 146-12-0
Part owners	Rs. 63- 0-0	Rs. 72- 0-0	Rs. 135- 0-0
Tenants	Rs. 30-11-0	Rs. 51- 0-0	Rs. 91-11-0

Health

"Fevers," skin diseases, and dysentery are the three most troublesome forms of illness, as reported by 192 families. Fate, poor water, weather, and bad food were named most frequently as the causes of illness. Public dispensaries, home remedies, and the village sorcerer, are the most common sources of medical aid. The average family spent Rs. 3–8–0 annually for medical help. One-fifth of this amount went to the village sorcerer. Those who visit the dispensaries often consider it desirable to keep on friendly terms with him also.

The belief that man's destiny is determined by higher powers beyond his control leads many of the peasant people to accept

BELIEVED CAUSES OF ILLNESS

Cause	No. of Times Mentioned
Fate	51
Poor Water	34
Weather	32
Bad Food	16
Too much work	13
Evil Spirits	12
Germs	11
Displeasure of God	9
The "Evil Eye"	4
Mosquitoes	3

Fate as the prime cause of disease. It is predestined, so it will be. The efforts of men to prevent it would be futile. To bow to illness and accept it as inevitable is the common attitude. Yet at the same time those who can afford to do so often seek any form of medical aid or means of escape that may be open to them,

Asked to name their most serious handicap the men mentioned most frequently the high rate of interest, mortgaged land, lack of capital, and the inability to procure land.

Credit on reasonable terms with suitable education and guidance in regard to its use for improving the farm business seems to be the

FARMERS' OPINIONS AS TO WHAT THEY NEED MOST IN ORDER TO IMPROVE THEIR ECONOMIC CONDITION

Reply	Number Reporting
Capital for use at lower interest	42
Curb activities of moneylender	30
Recover mortgaged land	20
A school for our children	16
Freedom from debt	9
Better prices for farm produce	13
More land to farm	9
Better method of farming	8
Better livestock, especially oxen	6
What is there to improve? Fate rules	5
Give up liquor	4
Pen up stray cattle	4
Stop gambling	3
Reduce social expenses	3
Government should reduce land revenue in lean crop years	3
More pasture space	2
Well for drinking water	2
Total	179

most immediate need of the backward class farmer. A reasonable amount of capital thus made available would enable the farmer to improve his livestock and procure more adequate equipment. This in turn would react favorably on crop yields, benefiting both owners and tenants.

Student apprentices operating small farms of $8\frac{1}{2}$ acres, $11\frac{3}{4}$ acres and $6\frac{1}{2}$ acres in connection with the Vocational Training School at Anklesvar had farm incomes of Rs. 216–6–0, Rs. 206–14–0, and Rs. 197–15–0, respectively. Those without experience would be well advised to spend several years working for a successful farmer before making investments for themselves. Young men of sound health, suitable training and initiative can earn a satisfactory income from farming.

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DETERMINATION OF RELATIVE RISKS INVOLVED IN GROWING TRUCK CROPS

MANY truck crops are highly speculative because of wide year to year fluctuations in both yields and prices. When selecting a truck crop, the relative degree of risk involved in growing it should be weighed by farmers. Although very low prices and yields for a crop in one year may be offset by very high prices and yields in another year, short run losses involved in growing such a crop sometimes necessitate rather severe and painful adjustments. For such a crop, operations are in the nature of a gamble. Years of high income are followed by years of low income; credit needs are accentuated.

Truck crop farmers may avoid these painful adjustments in either of two ways. First, price and yield risks may be reduced by greater diversification. Then low prices and yields for some crops in a given year will be offset by higher prices and yields for other crops. Second, if it is not feasible to plant a large number of crops, it may be possible to select crops that have comparatively stable price, yield, and value per acre experiences, much as some investors purchase stable high grade bonds rather than common stocks.

Table 1 shows the degree of annual variability from 1918–40 of United States yields, prices and value per acre for fifteen fresh market truck crops.Variability was measured by subtracting an-

nual crop prices, yields and value per acre from the preceding year's price, yield and value per acre. The standard deviation of these changes or first differences was then expressed as a percentage

TABLE 1. ANNUAL VARIABILITY[1] OF U. S. VALUE PER ACRE, YIELD, AND PRICE OF FIFTEEN TRUCK CROPS FOR MARKET, 1918–40[2]

Crop	Annual variability		
	Value per acre	Yield	Price
	Per cent	*Per cent*	*Per cent*
1. Asparagus	11	7	10
2. Green peas	12	8	11
3. Snap beans	13	12	12
4. Tomatoes	15	7	13
5. Lettuce	17	8	13
6. Strawberries	18	14	16
7. Cantaloupes	19	8	16
8. Celery	19	5	18
9. Spinach	19	13	17
10. Cauliflower	20	8	19
11. Cucumbers	26	11	24
12. Watermelons	28	11	29
13. Cabbage	29	15	39
14. Onions	36	15	45
15. Irish potatoes	46	9	53

[1] Measured by subtracting annual prices, yields and value per acre of 1918–40 from preceding year's prices, yields and value per acre; then computing the standard deviation of these changes and expressing it as a percentage of the average price, yield or value per acre for 1918–40.

[2] Preliminary.

Computed from reports of the Bureau of Agricultural Economics.

of the average (arithmetic mean) price, yield or value per acre.[1] This percentage may be called "the degree of annual variability."[2] By computing the standard deviation of the first differences rather than the observations, secular trend was minimized.

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[1] i.e. $\sqrt{\frac{\frac{\sum(d-\bar{d})^2}{n-1}}{M}}$ Where d = first differences between annual observations, $\bar{d}$ = mean of first differences, n = number of observations, M = arithmetic mean of observations.

[2] The coefficient of variation, another measure of variability, measures variations of the observations from the arithmetic mean of the observations; but it accentuates the degree of annual variability more than it may actually be, if a secular trend characterizes the data. See Frederick C. Mills, The behavior of prices, pp. 39–60. Mills computed annual price variability by "the mean deviation (from the mean) of link relatives of average annual prices,' 'p. 49. This was helpful in reducing trend effect. See also Mills, Statistical methods, pp. 156–157, and 490 ff.

According to this measure the fifteen truck crops ranged in annual variability of value per acre from 11 per cent for asparagus to 46 per cent for potatoes. Because in any given year fluctuations in one area offset those in another area, the United States average change of value per acre is relatively moderate compared with changes in individual areas.[3] Least variability was recorded in asparagus, green peas, snap beans and tomatoes; most variability by cucumbers, watermelons, cabbage, onions and potatoes. The greater variations of value per acre for the latter group of crops make them more speculative than the former.

The degree of price variability appears to be most important in affecting the variability of value per acre. Differences in elasticities of demand and supply for the different crops cause great differences in price fluctuations. But yields are also important. For many crops, particularly those with an elastic demand, yields change directly with prices. More intensive cultivation and harvesting is encouraged by higher prices. Prices and yields move upward at the same time, the combination causing sharp changes in value per acre. However, for crops, with a relatively inelastic demand, high yields are associated with low prices. The change of value per acre is modified because the low prices are offset by the high yields.

Variability of United States' prices for the fifteen crops listed in Table 1 ranged from 10 per cent for asparagus to 53 per cent for potatoes. The inelastic demand for potatoes accounts in part for the great variability of potato prices while the relatively inelastic supply of asparagus explains in part the small degree of price variability for this crop.

Variability of United States' yields ranged from 5 per cent for celery to 15 per cent for cabbage and onions.[4] Yield fluctuations are largely determined by the sensitivity of a crop to weather and disease conditions.

Truck crops produced in different seasons have different degrees of price and yield variability. Winter crops are subject to great yield and supply changes caused largely by sharply varying weather

[3] The comparisons shown in Tables 1 and 2 are useful as examples of how variations differ for different crops *on the whole*. On individual farms, different results may be obtained.

[4] The data used did not reflect in full the degree of yield risk for the different crops. Acreages that are rendered useless by flood, freezing or similar conditions are not included in crop reports of yields. This is especially true of the winter crops.

conditions. But this is offset in its effect on prices by relatively elastic demand. On the other hand, summer crops do not experience the same degree of varying weather and supply conditions but demand is less elastic for these crops emphasizing the effect of relatively small changes of supply on prices.

Table 2 shows the relative variability of value per acre of ten

TABLE 2. ANNUAL VARIABILITY OF VALUE PER ACRE OF TEN TRUCK CROPS FOR FRESH MARKET BY SEASON OF PRODUCTION AND FOR FLORIDA AND NEW JERSEY, 1918–40[1]

Crop	Annual variability				
	United States	Winter season		Summer season	
		One group of marketing areas	Florida	One group of marketing areas	New Jersey
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1. Green peas	12	32	33	18	29
2. Snapbeans	13	34	34	29	33
3. Tomatoes	15	40	37	29	38
4. Lettuce	17	27	31	38	46
5. Cantaloupes	19	30	46	24	28
6. Celery	19	48	57	26	31
7. Spinach	19	28	—[2]	21	22
8. Cucumbers	26	37	34	39	23
9. Onions	36	61	—[2]	46	35
10. Irish potatoes	46	38	45	55	46

[1] Preliminary.
[2] No reported data.
Computed from reports of the Bureau of Agricultural Economics.

vegetables for one representative winter and one summer group of marketing areas. On the whole, value per acre of the winter crops was more variable than value per acre of the summer crops. Winter crops with least variability of value per acre were lettuce, spinach, cantaloupes and green peas. Those with most variability were onions, celery, tomatoes, and potatoes. Summer crops ranked somewhat differently. Summer green peas had the least variation of value per acre followed by spinach, celery, snap beans and tomatoes. Potatoes were most variable, followed by onions, cucumbers and lettuce.

Variability of value per acre for the ten truck crops was also computed for one winter and one summer producing State. (Florida and New Jersey—Table 2). On the whole, variability was

greater for these individual States than for the marketing groups to which they belong, largely because of the offsetting effect of different State changes. Variability of value per acre in Florida ranged from 31 per cent for lettuce to 57 per cent for celery while variability in New Jersey ranged from 22 per cent for spinach to 46 per cent for potatoes.

Measuring the variability of value per acre to determine the relative risk of growing different truck crops is useful in making the farm crop plan and need not be confined to truck crops only. The degree of variability of value per acre may also be used as one guide for choosing between other crops and even for choosing between different farm enterprises. In making decisions as to what enterprise or crop will be adopted many factors are taken into account. Among these consideration should be given to the amount of risk involved in growing a crop.

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WHAT WE EAT

ESTIMATES of the amounts of each of the important kinds of food consumed per capita are used as a basis for much of the current planning. Many persons who use the figures are incorrectly assuming them to be estimates of food eaten. The quantities quoted as "consumed" are either the amounts that start from the farm in the direction of the consumer, or the amounts sold by one of the first processors. This article is an attempt to go part way in paring down these "consumption" figures to more nearly approximate the quantity of food we actually eat.

Foods have been compared on the basis of Calories, since this unit of energy provides a convenient common denominator. Before some nutritionist takes issue with us on this point, we hasten to acknowledge the fact that other measures, such as the quantity of each of the important vitamins, the mineral content and the protein content, are fully as important as the caloric content. However, before one can make any measurement of the national diet in terms of any one of these values, we should first know the quantities eaten.

The losses between the farm and the consumer occur in processing, transportation, storage, selling, preparation, and finally on the

table. The total production of crops is reported by farmers as "field run." A bushel of wheat at the farm represents less than a bushel of recleaned wheat at the elevator. After the wheat has been cleaned, the rats eat some while in storage. Some is lost in the bottom of the railroad car. Some food is condemned as being unfit for human consumption. Losses occur in milling, in baking, and on the table, to mention only the more obvious losses in the long trip from the farm to the mouth of the consumer.

The losses estimated in the column headed "by-products and refuse" represent only those losses on which some evidence is available (Table 1).

Estimates of food consumption were reduced because much of the product is lost or used for by-products. But a considerable portion of the remainder is wasted in the kitchen and on the table. "The sink is the best fed member of the household," is an expression of the nutrition worker who wants to emphasize the fact that much good nourishment goes down the drain with the cooking water. And any garbage collector can testify that not all the food which reaches the table is consumed. The Bureau of Agricultural Economics studied urban garbage production in 1939–40 in 412 cities.[1] About 302 pounds of garbage per capita was produced in these cities. Atwater[2] found that student clubs, where economy was the rule, wasted 10 to 14 per cent of the nutritive value of foods, and that institutions often waste 25 per cent.

The total Calories in the food listed in the column headed "eaten," in Table 1, average 3,642 per day, or about 20 per cent higher than the caloric requirements of the population as estimated by authorities on nutrition. Atwater's figures indicate that much of this difference is due to the wastes in preparation and on the table. Since no evidence is available on the amount of these wastes by type of food product, no attempt has been made to correct the "pounds eaten" column in Table 1 for these wastes. Probably differences in the proportion wasted do exist. One is more likely to leave a piece of bread for the garbage man than to discard a tender piece of steak. Data on wastes by type of food, and on where the wastes occur, are badly needed as a basis for refining the estimates

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[1] The agricultural situation, March, 1942.

[2] W. O. Atwater, Principles of nutrition and nutritive value of food. U.S.D.A. Farmers Bulletin 142, 1902, p. 46.

TABLE 1. CONSUMPTION OF AGRICULTURAL PRODUCTS PER CAPITA, CONTINENTAL UNITED STATES, 1941

	Pounds per capita per year			Calories per pound edible portion[5]	Per cent of total Calories consumed
	"consumed"[1]	By-products and refuse	Eaten		
	pounds	pounds	pounds	pounds	per cent
Wheat	223	67[2]	156	1,615	19.1
Corn	67	23[2]	44	1,690	5.6
Rice	6	—	6	1,590	0.7
Other cereals	34	12[3]	22	1,600	2.7
Potatoes	144	44[2,4]	100	385	2.9
Sweet potatoes	21	7[2,5]	14	565	0.6
Fresh vegetables	252	75[3]	177	200	2.7
Canned vegetables	30	—	30	300	0.7
Dry beans	10	1[2]	9	1,545	1.0
Fresh citrus	64	18[5]	46	230	0.8
Fresh apples	42	5[5]	37	290	0.8
Other fresh fruit and juices	74	—	74	200	1.1
Canned fruit	19	—	19	300	0.4
Dried fruit	6	—	6	1,300	0.6
Beef and veal	71	12[5]	59	1,220	5.4
Pork	70	8[5]	62	2,420	11.3
Lamb and mutton	7	2[5]	5	1,420	0.5
Fish	15	5[5]	10	445	0.3
Chicken and turkey	24	10[5]	14	560	0.6
Eggs	38	4[5]	34	715	1.8
Milk	353	—	353	310	8.2
Condensed milk	20	—	20	630	0.9
Butter	17	—	17	3,325	4.3
Cheese	6	—	6	1,785	0.8
Other dairy, fluid milk	34	—	34	310	0.8
Lard	14	—	14	4,080	4.3
Other fats and oils	21	—	21	4,080	6.4
Cocoa	5	—	5	1,940	0.7
Sugar (raw)	111	8[3]	103	1,805	14.0

[1] The National food situation, B.A.E., U.S.D.A., mimeographed, April, 1942
[2] O. V. Wells, B.A.E., U.S.D.A.
[3] Estimated by writers.
[4] P. J. Findlen, Farm economics, Cornell, October, 1938, p. 2656.
[5] Proximate composition of American food materials, U.S.D.A., Circular No. 549, 1940.

of total food requirements, and as a guide for those who have responsibility for reducing wastes.

Although the unmeasured waste may vary between foods, at least the data in the "pounds eaten" column, Table 1, provide a much better basis for comparing the contribution of each to the national diet than do the figures in the column headed "pounds consumed," although the latter are usually quoted.

About one-third of our food supply comes from cereal grains, potatoes and sweet potatoes. Bennett used the proportion of these foods as an indirect measure of the standard of living of a country.[3] In most of the countries of the world, more than 80 per cent of the caloric value of the diet is made up of these low-cost foods.

Three important food groups—meat, dairy products, and sugar—are about equally important in our diet, as measured by Calories. Each of these three groups supplies between 14 and 18 per cent of our total Calories. Fats and oils supply about 11 per cent. Although fruits and vegetables other than potatoes are important sources of vitamins, minerals and bulk, they supply less than 10 per cent of the total Calories.

Traditionally, we have been extravagant in the use of land and economical in the use of man labor in the production of farm products. If it becomes necessary to use land in such a way as to produce a maximum amount of human food, it is instructive to compare crops on the basis of Calories produced per acre (Table 2). An estimate of 3,300 Calories per capita per day was used in making these estimates, to allow for some of the unaccounted-for losses.

Sugar beets supply by far the largest number of Calories per acre of any of the common crops. The 3,345 pounds of sugar produced per acre of beets during the 10-year period 1930–39 supplies the caloric need of 5 persons for a year, or 501 persons from 100 acres of beets. The Calories produced by 100 acres of sugarcane, after making allowance for the cane used for planting, was enough for 387 persons for a year. Unfortunately, sugar is poor in nutritional values other than Calories.

Rice produced an average of 2,178 pounds of rough rice per acre. After making allowances for seed requirements, by-products and refuse, the amount available for human consumption from 100 acres of rice would provide enough Calories to feed 170 persons for a year.

[3] Merrill K. Bennet, International contrasts in food consumption, The Geographical Review, July, 1941.

Sweet potatoes and Irish potatoes each lose about 32 per cent in storage and in preparation for the table. A substantial proportion of the Irish potato crop must be saved for seed. In spite of these handicaps, these two crops produce a large amount of food for human consumption from a given area of land. One hundred acres of sweet potatoes would provide Calories for 139 persons compared with 125 persons for Irish potatoes.

Corn is used primarily for animal feed. When used for human food the corn meal and other corn products would supply about the same number of Calories as potatoes.

TABLE 2. THE PRODUCTION OF HUMAN FOOD FROM AN ACRE OF LAND

Crop	Yield per acre[1]	Average per acre			Calories per pound edible portion[4]	Energy per 100 acres equal to annual food eaten by
		Needed for seed[2]	By-products and refuse[3]	Edible portion		
	pounds	pounds	pounds	pounds	Calories	persons
Sugar from beets	3,345	—	—	3,345	1,805	501
Sugar from cane	2,585	—	—	2,585	1,805	387
Rice	2,178	100	790	1,288	1,590	170
Sweet potatoes	4,565	200	1,397	2,968	565	139
Irish potatoes	6,756	1,000	1,842	3,914	385	125
Corn	1,316	10	444	862	1,690	121
Soybeans	966	30	28	908	1,590	120
Peanuts	714	25	182	507	2,780	117
Dry beans	781	60	—	721	1,545	92
Wheat	798	100	209	489	1,615	66
Oats	874	100	341	433	1,795	64

[1] United States Crop Reports, 1930–39.
[2] Estimated by writers from various sources.
[3] See footnotes to Table 1.
[4] Proximate composition of American food materials, U.S.D.A., Circular No. 549, 1940.

We are just learning to use soybeans as human food. The German Army cook book, as translated in the Soybean Digest, December, 1941, contains some of their instructions and recipes. Soybeans produce about as much food per acre as corn and potatoes and are rich in protein.

Spillman and Cooper,[4] who estimated the Calories per acre during the last war, reported much higher figures for most crops. They assumed higher yields. In 1918, a long series of reliable yield figures

[4] W. J. Spillman and M. O. Cooper, Human food from an acre of staple farm products, U.S.D.A., Farmers Bulletin 877, 1918.

was not available. Another important reason for the difference is in the method of calculation. The early writers made no allowance for amounts used for seed or for losses in by-products and waste.

The extent to which one crop can be substituted for another is limited by such factors as soil, climate, topography and many other factors. Rice cannot be grown on the wheat farms of North Dakota, nor wheat on the rice farms of Louisiana. Manufacturing equipment is needed for sugar production. But many areas are equally adapted to many different crops. To the extent that human food is needed, such crops as sweet potatoes and Irish potatoes should be given preference.

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REVIEWS

Imperfect Competition Within Agricultural Industries, William H Nicholls, Ames, Iowa, Iowa State College Press, 1941. Pp. 384. $3.75.

The author himself tells us that this book should be judged by its aid in applying economic theory to practical research problems. This is indeed an objective of great importance. Any narrowing, however small, of "the gap between tool makers and tool users" is a significant contribution. Readers of this book will no doubt differ among themselves regarding the extent to which Mr. Nicholls has actually succeeded in presenting "a smoothly working combination of empirical data and theoretical research method," but all, I think, will agree that he has made a valiant attempt. After a careful and painstaking exploration of the subject extending through some 360 pages, Mr. Nicholls himself is reluctantly forced to the conclusion that "whether the available theoretical tools will prove adequate or not [for attacking major problems in agricultural marketing] is as yet largely a matter of relative optimism." He feels, however,—and this reviewer agrees with him—"that the use of these tools is at least a step in the right direction, if their limitations are constantly recognized."

The major contributions of this book are along two lines: (1) The existing theory of imperfect competition as developed by Chamberlin, Robinson, and others is adapted to the buying side of the picture, an aspect which has not heretofore been adequately presented in a single source. (2) The inherent limitations of existing theoretical analysis for use in empirical research are laid bare, and thus the reader is forewarned regarding the practical application of the "kit of tools" placed before him. Both of these jobs needed to be done, and Mr. Nicholls has done them thoroughly and well.

The central theoretical problem with which Mr. Nicholls deals is that of defining the equilibrium adjustments of an individual firm in an agricultural processing-distributing industry which consists of a few dominant firms and a large number of small competitive firms. The two sources of imperfect competition on the buying side are taken to be (1) a deficiency in the number of dominant firms and (2) the existence of preferences among producers selling to processing-distributing firms.

Initially the analysis is restricted to competition among the few

dominant firms and later it is extended to the relation between the dominant firms and the many small firms. The equilibrium adjustments of the dominant firms are shown to depend upon the amount of knowledge which each has or assumes regarding the extent and timing of his rival's reaction. It is here that the usefulness of the simplified models in empirical research is particularly limited because of the number and complexity of rivals' reactions that are equally plausible on *a priori* grounds.

In the main, the author is concerned with static situations, in so far as it is possible to consider oligopolistic or oligopsonistic market structures without implicit reference both to time and to serial relations over time. A short section of the book is devoted to consideration of "economic dynamics." The production-plan device is the major method of analysis used in this section. The treatment of temporal interrelationships is rambling and topical, as indeed such analysis must continue to be until there is formulated a well-developed body of short-run theory.

For the most part Mr. Nicholls refrains from making ethical pronouncements about the real world on the basis of his simplified theoretical models. In places, however, he suggests, at least implicitly, that in the typical agricultural processing-distributing industry aggressive price competition tends to be replaced by "market sharing" and "price leadership."

This book merits careful study by general economists as well as by agricultural economists. It will be especially welcomed by persons engaged in research relating to marketing and prices of agricultural products.

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American Highway Policy, Charles L. Dearing, Washington, Brookings Institution, 1941. Pp. xii, 286. $3.00.

This is an excellent book, dealing with a subject of great present interest and importance. By means of historical survey and theoretical analysis, the author arrives at clear-cut conclusions upon many matters which have heretofore been involved in considerable uncertainty and controversy.

Mr. Dearing finds that, barring certain exceptions, which have never worked well, the public roads have always been supplied by government as one of its essential public functions, and he concludes that this should so continue. The modern highway system he

describes as a "multiple-purpose facility," providing four principal services: i.e., (1) to give access to land and dwellings, (2) "to facilitate the movement of goods and people primarily associated with community life," (3) to provide the means of mobility between communities, and (4) to serve the special needs of government itself. On this use analysis he bases his development of the principles governing ownership, control, and financing of the several parts of the rural road system (the city streets are not brought into consideration).

Ownership and administrative management of the nation's public roads should reside, as it always has, in the states and their local subdivisions—not in the federal government. The states should own and control a state highway system of general use roads, providing inter-community mobility. The community-service and land-access roads should be assigned to local subdivisions, usually the counties.

State or general-use roads, requiring high standards of construction and relatively heavy cost, should be financed entirely by contributions from motor-vehicle users; gasoline taxes are suitable to pay for occupancy, while properly adjusted registration fees will serve to apportion the fixed charges of the highway plant. The local roads—community-service and land-access—should be financed by the property tax and other general local taxes, placing the burden chiefly on land ownership. When the local roads are called upon to provide a service more costly than would be required by their basic local functions, as for carrying school buses, then the added cost may be financed by state contributions to the local governments in control of such roads.

The federal government enters into the picture when it gives financial aid to the states; such aid should be in consideration of those activities only which serve broad national interests. The money thus required should be obtained by the federal government, not from special taxes on the users, but from general revenues.

It is clear that this book is based on exhaustive study and full knowledge of the rather extensive literature of the subject. It is fully and carefully documented. If a minor criticism is here in order, it is suggested that footnote references, as to journals, Congressional Record, etc. would be more helpful if dates of publication were always given.

The author has evidently prosecuted his study in an objective, scientific spirit, and his discussion will command the respect and

confidence of the reader. The subject matter is well organized and, barring a few instances where a certain heaviness of style leads to obscurity, clearly presented. At only one point does there appear to be a lapse in logic. In arguing that the gasoline tax is unsuited for general fund purposes, because of its "regressive" character (page 184), Mr. Dearing is guilty of the common error of presuming to judge a particular tax on the basis of regressivity, forgetting that, in a system composed of taxes of many kinds, that test may logically be applied only to the whole system. As it happens the soundness of his conclusion in this particular instance is not affected.

Altogether the author's reasoning is logical and convincing, and his conclusions, depending on adequate historical evidence and sound theory, are well established. He has put us a long step ahead on the path toward a sound American highway policy.

FRED ROGERS FAIRCHILD

Yale University

American Farmers in the World Crisis, Carl T. Schmidt, New York, Oxford University Press, 1941. Pp. xi, 345. $3.00.

This work was completed in 1940 and consequently is not concerned, as its title might now imply, primarily with agriculture's part in the war. Instead it is a discussion of recent agricultural programs and of conditions leading up to their adoption. While the work will add little if anything to the stock of knowledge of the careful student of the subject, it is a very readable description of agricultural problems and an exposition of various governmental programs which ought to be welcomed by the general reader.

The volume is divided into nine chapters. The first two present a picture of the agricultural industry and some of its problems. The third refers briefly to activities of farm organizations and to some of the proposals and programs following the World War. Two chapters discuss agricultural adjustment programs, one considers credit, and one is entitled "Saving Human and Soil Resources." Some attempt is made to assay the benefits and burdens of farm relief in one chapter and the concluding chapter reviews prospects for the future. Various newspaper cartoons are reproduced to supply graphic portrayal of certain points. These catch the eye and enliven the text but, naturally, often employ exaggeration for effect.

While the consequences may not be particularly serious in a

work of this type, there are places where more careful checking would have been helpful. For example, it is indicated (p. 43) that farm mortgage debts continued to rise until 1928 when, in fact, the peak was reached in 1923. The 42-cent tariff on wheat was established by Presidential proclamation instead of by a tariff act in 1924 (p. 113). The trade-agreements program is called the "trade-treaty program" (p. 196). Not everyone will agree that it is correct to say that the movement to form large cooperatives during the 1920's "collapsed," or that the basic reason for cooperative decline was that the movement "did not attract sufficient support from farmers" (p. 94). The author makes the flat assertion that "Generous as the Government has been to farmers, it has been even more helpful to city people," (p. 111). At the best, this is only an opinion. It apparently assumes, among other things, that the tariff has benefited industry and thereby city people generally, and has not subsidized agriculture.

One must agree with the point that stocks of certain farm products built up as a result of governmental programs are serving a very useful purpose in the present war situation. However, the real test of the "ever-normal granary" will come in its functioning under more normal conditions. Further analysis of this and other points might well have been included. While it is true that the Agricultural Adjustment Administration and other agencies provide machinery for use in war activities (p. 295), it might have been noted that some aspects of the programs and organization tend to impede rather than to assist.

In spite of such weaknesses, however, the book presents a good review of agricultural programs. The author's treatment of the subject is well balanced in that he avoids extremes of criticisms and praise. While it does not contain anything particularly new and is not especially analytical in its treatment, it is well written and logically presented.

O. B. JESNESS

University of Minnesota

The Rice Economy of Monsoon Asia, V. O. Wickizer and M. K. Bennett, California, Stanford University, Food Research Institute, 1941. Pp. 358. $3.50.

The Food Research Institute is to be congratulated on preparing and publishing a book on rice, a commodity which, as a food for mankind, is fully as important as wheat. The fact that 95 per cent

of the world's rice crop is grown in the Orient, furnishing the basic food for some 800 million people, clearly shows that rice is the staff of life in this area. For students of the world food situation, this volume is required reading. For anyone studying post-war problems, it also contains a great deal of pertinent information, helping one to understand the food surpluses and deficits of the various Asiatic countries.

The Rice Economy of Monsoon Asia, written by two noted economists of the Food Research Institute, ably presents the place of rice in farming and its economic aspects in the Far East. Rice production, consumption, and trade for the important producing areas are analyzed thoroughly. Furthermore, in reading the book many interesting subjects worthy of considerable thought and discussion are suggested.

Throughout the volume many comparisons have been made between rice and wheat as to prices, place in the diet, and variability of production. The authors point out that the price of rice is higher per pound than wheat, citing prices at Tientsin and in the British grain market, but indicated at the same time that these were not representative points where true competition exists. Shanghai, a center where both rice and wheat are produced and consumed in large quantities, might have been used but here again one finds that rice is the higher priced food. In this connection, it was pointed out that over the past five decades the price of wheat has become relatively cheaper than rice.

Another subject worthy of additional research is the per capita consumption of food during depression years. This volume indicates that several Far Eastern countries appear to have reduced their per capita consumption of rice during the 1930's. The question is immediately raised: To what extent did the consumption of basic foods decline in the United States and in European countries during the depression years?

Several chapters are devoted to the potentialities for rice expansion through increased yields and acreages. It is pointed out that in the three large surplus areas, Burma, Thailand, and Indochina, the yields per acre are among the lowest. It should be mentioned in this connection that the price of rice in these three countries is probably also the lowest in the world. Therefore, it seems questionable that much time and money could be profitably spent in increasing the fertility of the rice fields. On the other hand, it is

undoubtedly true that, through the development of improved varieties and cultural practices, yields could be increased as they have been in Japan. During the past 30 years the yield per acre in Japan has increased 20 per cent while during the same period there was an expansion in acreage of 7 per cent. The Japanese Government has for the past 10 years been supporting a minimum price of rice, which undoubtedly had an effect upon maintaining the yield at a high level.

Because of the lack of accurate statistical data, the authors have been very careful to caution the reader continually in drawing conclusions. This appears to be warranted, particularly in regard to the sharp rise in population figures given for some countries where it is believed that improvements in sanitary and health conditions have not been marked.

If this book is to be revised there is one suggestion that many readers in this country would like to make—namely, that acreage, yield, and production statistics be given in American units rather than in the metric system. It should be mentioned again, however, that *The Rice Economy of Monsoon Asia* is an excellent contribution for those studying the world food supply and there is no question but that the authors have attained their major objective in presenting a clear picture of the economics of rice in the world's great producing region.

FRED J. ROSSITER

Office of Foreign Agricultural Relations

Introduction to the Cooperative Movement, Andrew J. Kress, New York, Harper and Brothers, 1941. Pp. 370. $3.00.

In the preface of this book, the editor states, "the attempt here is to set forth objectively, through readings and references, the best writings about the various types of cooperatives, in order to produce a scientific collection of writings for those who wish to know more about the cooperative movement." As indicated above, this book is made up entirely of readings and references.

Although the title indicates that it covers the whole field of cooperative endeavor, all but two of the twelve chapters are devoted to the consumers' cooperative movement. One of the two chapters just referred to relates to marketing cooperatives in foreign countries and the other to farmers' cooperatives in the United States, chiefly the marketing and purchasing associations.

The other ten chapters contain selected readings on various types of consumers' cooperative experience—some deal with historical development and the social philosophy of the consumers' cooperative movement while others contain appraisals of various schools of cooperative thought and summaries of international cooperation. One chapter each is devoted to such fields as cooperative medicine, consumers' cooperative production and cooperative banking.

Lists of references are given on the following subjects: The cooperative movement for particular countries, consumers' cooperation, the agricultural marketing cooperative movement, the financial cooperative movement, the social philosophy of the cooperative movement and a possible cooperative commonwealth, the international cooperative movement, and sources of statistics on cooperation. Many of the references suggest particular chapters, which, the compiler states, lend a shade of interpretation not contained in the readings actually quoted. The lists contain in all over 150 references, a few of which would be more useful if additional bibliographical data were given. No attempt is made here to appraise the references for each subject covered.

Because of the wealth of material on consumers' cooperatives that is available in the larger libraries, the contribution that a book such as this one can make to cooperative literature is somewhat limited. It is not, of course, adapted for use as a text. Students who are beginning to study the cooperative movement may find it useful as supplemental reading and reference material. Especially will this be true for those who do not have adequate library facilities available.

W. W. FETROW

Farm Credit Administration

Central America: Challenge and Opportunity, Charles Morrow Wilson, New York, Henry Holt and Company, 1941. Pp. 293. $3.50.

Mr. Wilson's little book on a big subject is both instructive and entertaining. The book devotes a chapter to each of the Central American countries, as well as to Colombia, Cuba, and Jamaica, paying particular attention to the physical characteristics of each country with a very brief summary of the history and political life of the country. The story of the principal, and potential crops of

these countries—coffee, bananas, coconuts, cacao, chicle, and rubber, among others—follows. The author then considers the future of Central America, presenting his ideas as to possibilities for agricultural development, and measures which will help raise the standard of living of the people of the region he calls "Middle America."

Middle America reminds us too much of *mitteleuropa* to provide an apt label for the region with which the author is acquainted. It seems probable that the editors of the book detected this difficulty with the result that the title appears as "Central America," although the author throughout his book refers to the region of which he writes as "Middle America."

The observations on nutritional deficiencies of the people of Middle America, and ways in which these deficiencies could be remedied are excellent and timely. Mr. Wilson sees romance in tropical agriculture and he is clever in imparting some of his enthusiasm to the reader. Not many writers on tropical agriculture have given as good a description of both the romantic side of agriculture in the tropics and the complexities of the major agricultural industries of tropical America, particularly the coffee and banana industries. But Mr. Wilson sees color in the Central American coffee industry more clearly than he sees the problems of the industry.

When the author tries his hand at prophecy he gives us a lesson that the generality of Americans might have learned earlier to their profit. He describes the lack of an American rubber supply as "one of the ominous weak points in plans for coordinated defense of this hemisphere." This is a theme that has been brought out in several reports of Government agencies during the past three years, particularly in literature on Latin America issued by the Department of Agriculture. He adds that the possibilities for meeting United States rubber requirements with synthetic rubber are entirely out of reason, and he warns that failure of our natural rubber supplies "would almost unquestionably spell the lapse of the industries of steel, glass, and electrical manufactures." The author is enthusiastic in his presentation of the case for Central America as a source of natural rubber. This enthusiasm reaches a point where, at least by inference, it conveys the impression that "Middle America" is the only good source of natural rubber. Of course this is not true. Rubber experts seem to agree that a great deal of our wild and

plantation rubber in the Western Hemisphere will come from the Amazon Basin.

Middle America is pictured as a tropical paradise by the author. This description is devoid of the reality which would serve to disclose why this area represents the most backward region of the American Hemisphere. In this connection the author seems to have neglected to give the reader who is unfamiliar with the area an insight as to the progress, or lack of progress, of these countries, and of the economic, political, and social difficulties which for so many years have impeded their development. It is a fact that in general the economies of the majority of these countries are characterized by production for export of a limited number of crops. The author's only suggestions for bettering the economic condition of our Middle American friends is to urge them to grow agricultural commodities on a larger scale. The foreign markets he relies upon did not exist when the book was written, and they are hardly more likely to become favorable outlets for the usual Central American tropical commodities at the end of the war. His other recommendation is that American foreign trade promoters might profit by following German technics of trade promotion, at least in some respects. American salesmen should know their customers better, they should speak their language better, and in fact, they should peddle their wares from door to door. In this connection I believe there is room for considerable improvement with respect to our methods of doing business in Latin America. It appears that American salesmen and business firms have not been as solicitous as their European competitors, and have made little effort to understand their customers to the South. It does not seem that these two suggestions would meet the fundamental difficulties involved in raising incomes and standards of living in the republics of Central America.

The book is best where it describes agricultural enterprises which are unfamiliar to North Americans. Few students of temperate zone agriculture realize the complexities of banana production, or banana marketing, or that coffee growing and coffee curing are quite as intricate and elaborate as, say, tobacco growing and tobacco curing in the United States.

The extent to which Mr. Wilson's book has been condensed probably did not permit him to discuss the agricultural industries which have recently received increased attention. For example, he does not mention the substantial henequen industry of Cuba, nor the

abaca experiments in Costa Rica and Panama. The efforts to develop textile industries in these countries, and their possibilities, are barely mentioned. In fact, rather than to expand current production for uncertain foreign markets, the author might well have recommended a more balanced agricultural development in Middle America. By this is meant not uneconomic production but the stimulation of subsistence agriculture, and the development of new export crops in demand in the Western Hemisphere. The competition of low-wage tropical countries outside this hemisphere coupled with the lack of capital and technical assistance has retarded the economic progress of Middle America. But the author's program for producing more coffee and cacao would seem only to aggravate an already bad situation.

There are minor errors in the book. El Salvador is not the smallest nor the most densely populated of the American Republics. It appears that Haiti would have prior claim to that position. The United Fruit Company owns not 130,000 acres but over 3,000,000 acres of which 122,000 were planted to bananas in 1941. Those who remember the bloody revolts in El Salvador of 12 years ago would be inclined to question Mr. Wilson's statement that El Salvador has a tranquil history. Costa Rica's Atlantic coast is estimated at 200 miles and not 20 miles as indicated on page 76. The annual increase in population in Jamaica is closer to 2 per cent than to 20 per cent.

As a whole the author has done an excellent job of presenting a complex subject of wide scope in such a small volume. He has done so, moreover, in an entertaining manner. The result is that he has accomplished more by way of informing our people about Middle America than many other writers have done in more voluminous works, and certainly more than other writers have done in comparable space devoted exclusively to a popular presentation of the subject.

JOSEPH C. APODACA

Economic Defense Board

Mathematics in Agriculture, R. V. McGee, New York, Prentice-Hall, Inc., 1942. Pp. 189. $4.00.

In the words of the author, "this book is the result of an earnest effort to meet the demand for a practical book on mathematics, designed especially to fit the needs of persons interested in agriculture." It perhaps is significant that the book is not suggested as a

text for a college course in "Agricultural Mathematics" although it might be so used. The book may be equally useful in supplementing courses in agricultural engineering, animal nutrition, and agricultural economics. Few agricultural students would fail to benefit from an intimate contact with it.

A review of the table of contents does not portray adequately the true content of this small volume. For example, chapter 4, titled "Lengths, Areas, and Volumes," leads to the solution of such problems as "how many gallons of paint should be required for two coats on the walls of a barn 32 feet by 48 feet if the walls are 12 feet high," and "how many square feet of tin are required in making 120 feet of gutter" of prescribed diameter. Under "Ratio and Proportion" in chapter 5, the student learns how to calculate the speed of a 6 inch pulley if it is belted to a $9\frac{1}{2}$ inch tractor pulley that makes 1,000 r.p.m. as well as how much force is required to lift a given weight with a six pulley block and tackle. Under "The Right Triangle and Trigonometry," in chapter 6, ways of measuring the area of irregular pieces of land are developed at some length and the legal description of area boundaries are interpreted.

An outstanding feature of *Mathematics in Agriculture* is its wealth of problems which accompany each chapter or are included in chapter 9 on "Special Applications of Practical Measurements." Correct answers to these should be made available if the book is to be used for self instruction.

At points the discussion or presentation of subject matter is too brief for the book to be most useful as a text. At other points material is included which, in the opinion of this reviewer, might better be covered in books on statistics. Discussions of the standard deviation and of graphic presentation are illustrations of the latter.

By the nature of the subject and its manner of presentation this book is likely to be used as a reference in actual practice as well as in the classroom. For that reason it is to be hoped that formulas for calculating the depreciation of milk cows, the volume of concrete mixtures of differing proportions, the plant food content of fertilizer ingredients, and the like, are approximately correct even though it is stated in the preface that "the text is not meant to serve as an authoritative source on technical matter pertaining to agriculture."

DANA G. CARD

University of Kentucky

Food and Drug Regulation, Stephen Wilson, New York, American Council on Public Affairs, 1942. Pp. xi, 177. $2.50.

Food and drug regulation in the United States has had a long and stormy career. Every extension of these regulations constitutes an increase in the governmental regulation of some business and an interference with the freedom of choice by consumers. It is only natural that these extensions should be fought step by step by the interested parties. This battle is reviewed in the present monograph.

The controversy has gone on for more than half a century. The first general pure food measure designed primarily to protect the consumer was introduced into Congress as early as 1891. It took twenty-five years of effort however to enact the first Pure Food and Drug Act into law in 1906. In the meantime striking demonstrations of the need for such a law had been made by Dr. Wiley, and toward the close of the period the press, particularly the magazines, were carrying on a spirited campaign in favor of the passage of such a law. The story of the events preceding the passage is enlightening but far from inspiring.

It did not take long after its passage to discover that the law had serious defects. The author reviews these carefully. The penalties were mild, there was necessity for judicial action in each contested case, the therapeutic statements had to be both false and fraudulent, there was no control over cosmetics nor over advertising not on the package, and the 'distinctive name' provision of the law prevented adequate control of branded food products. Correction of these defects, however, was not easy. A new law was not passed until 1938, more than 30 years after the original act. The names of the characters had changed, but the fundamental issues remained the same and the story of the passage of the new act was similar to that of the earlier one. Toward the close a widespread series of preventable deaths from a solution containing sulfanilimide aroused the public and a transfer of the controls over advertising to the Federal Trade Commission pacified the opposition and passage became possible. The new law is a great improvement over the old though still not perfect.

The author has given us an excellent and well documented survey of these events and agricultural economists should find them of great interest.

WARREN C. WAITE

University of Minnesota

Case Studies of Consumers' Cooperatives, H. Haines Turner, New York, Columbia University Press, 1941. Pp. 330. $2.50.

This is one of the better books published in recent years on consumer cooperation in this country, but like most other books on this subject it has considerable pro-cooperation flavor. Most writers on this subject show their bias through overstatement. Much of the bias in this book lies in the selection of material for study. The discussion is handled with considerable restraint.

This book consists for the most part of studies of selected cooperatives, namely, the United Cooperative Society of Maynard, Massachusetts and the Central Cooperative Wholesale of Superior, Wisconsin, together with brief reference to a few local affiliates. There can be little doubt but that these cooperatives have had considerable success in the wholesale and retail distribution of groceries and related products on a cooperative basis. They are probably the outstanding examples of consumer cooperation in the grocery field in the United States. They are, therefore, not typical of the movement as a whole. This is not to discredit in any way the attainments of these two groups for they are to be commended. It is merely to point out that their activities alone do not represent the complete or even representative experience of this type of organization in the retail grocery field in this country.

The author devotes a considerable portion of his book to a comparison of these cooperatives with private firms of both the independent and chain store type. This comparison relates to prices of selected products, margins and operating statements. Any such, comparison between private and cooperative firms is likely to be quite unsatisfactory since as the author himself admits the organization, management, methods of doing business, and communities served are not wholly comparable. One of the principal points of difference is to be found in the contrast between communities served by the cooperative stores and by the private chains. Cooperative stores are found mainly in the smaller towns and rural communities, while the chain stores confine their activities mainly to cities and industrial centers. Moreover, no comparison is made with the "super," self-service type of store which has been developed extensively by the private chains in the past few years.

This comparison between cooperative and private firms leads the author into many questionable statements since the cooperative is pictured as having many virtues and few if any faults. The other

(the private firm) is said to have the opposite colors. Probably neither type of business has a monopoly on either the virtues or the vices. It is the reviewer's opinion that the book would be improved if it were confined to the case studies of the cooperatives investigated as the title implies. There is a splendid story to be told without berating either the competitors of these cooperatives or the economy as a whole.

The author experiences considerable difficulty in reconciling the consumer philosophy with some of the practices of these cooperatives. The avowed purpose of consumer cooperatives is stated as doing away with the profit system and reorganizing our entire economy on a consumer basis. This is to put the consumer interest above public interest or to claim that the two are always synonymous. In one part of the book the consumers' cooperative is aligned with labor (a type of producer) and in another section it is stated that the cooperatives in the Lake Superior region concede the need for workers and farmers improving their bargaining power and are reported as having assisted in organizing labor unions and farmers' marketing associations.

The author sets forth two major questions in the concluding section of the book as having been considered in his study. These are (1) the contributions of cooperatives to the solution of certain socio-economic problems, and (2) the prospects for further cooperative growth in the United States. Both questions are much too broad to be answered with any degree of finality from case studies of two consumer-cooperatives. This is not to say the general conclusions are necessarily faulty. The point is that these general observations are made quite independently of the facts and figures arising from the detailed case studies.

The principal value of this book lies in the specific information which it contains on the growth and development of these "case" cooperatives. This in itself is justification for the publication. It is only as the author gets away from his cases that he becomes vulnerable. The book is well organized and very readable.

RUDOLPH K. FROKER

University of Wisconsin

The Analysis of Economic Time Series, Harold T. Davis, Bloomington, Ind., Principia Press, 1941. Pp. 620. $5.00.

The publication of *The Analysis of Economic Time Series* by Professor Harold T. Davis marks an important event in the devel-

opment of economic theory, and both students and teachers of statistical economics and econometrics will be grateful to him for supplying them with such an outstanding text of this complicated subject. It must be said at the start, however, that this book was not written for economists who do not have a solid mathematical background. Although much of the general discussion and especially the historical review of some of the topics involved can be read by mathematically untrained students, the bulk of the book will be unintelligible to them.

It would not be true to say that Davis had simply put together all that is known of the theory of time series analysis. He has done more than that. He has taken the several diverse problems in the field and has integrated them into a coherent pattern.

Chapter 1 gives an excellent historical review of the problem of time series analysis, and for that matter, an excellent digest of the book itself. This chapter could and should be read even by those who have had little mathematical training. Chapter 2 introduces harmonic analysis, Fourier series, and orthogonal functions. This important topic in time series analysis is again taken up in Chapters 5 and 7. Chapter 3 takes up the topic of serial correlation where the problems of lag, autocorrelation and Yule's contribution to the field are treated from the point of view of modern mathematics. Chapter 4 deals with the theory of random series; the problem of tests for randomness is taken up and the work of Yule and Slutsky examined. Chapter 5 has for its subject the degrees of freedom in a economic time series. Professor Davis introduces a new concept in this field and develops the Shuster, Walker, and Fisher tests of significance in harmonic analysis. In this chapter Professor Davis also makes some interesting applications of the technique of factor analysis—a technique that had its development in psychology—to economic variables.

In chapter 6 the analysis of trends is discussed. Polynomial trends, logistic trends and the problem of seasonal variation, and the Variate Difference method are dealt with. Chapter 7 introduces again periodogram analysis and the technique is applied to a great many economic series. Chapter 8 treats somewhat exhaustively the different theories and explanations of business cycles. Chapter 9 discusses the nature of wealth and income. Most of this chapter and parts of several other chapters have already appeared in Professor Davis' earlier book, *The Theory of Econometrics*. Chapter 10 discusses the dynamics of trends from the point of view of the

equation of exchange. In chapter 11 the problem of forecasting economic time series is discussed. Here the important problem of the standard error of forecast as developed by Hotelling and Schultz is analyzed and modifications are suggested. Chapter 12 reviews the material presented from the point of view of the different theories of business cycles and goes into some general speculations on the economic interpretation of history.

This bare and incomplete outline of the topics covered does not do justice to the wealth of research and painstaking work that have gone into the making of this book. The numerous applications of the theories to actual economic series are not only helpful in understanding the points involved; they also give an illuminating insight into the economic structure itself.

Although this admirable treatment of the subject of time series analysis merits nothing but praise, several critical comments may well be made. The outstanding criticism of the book is that while reading it, one gets a feeling that all is well with the science of economics, a feeling that is not justified by its present stage of development. This feeling of security is more a fault of style than a conscious misrepresentation of facts.

A careful reading of each chapter indicates that most of the theories developed are no more than suggestive of what the future advancements might be in the field of economic time series analysis. Although many hypotheses have been put forth for explaining economic phenomena, they still remain as hypotheses. They are interesting and provocative but that is all. Perhaps the best way to express what is involved is to quote the last paragraph of this book, wherein Professor Davis quotes a conversation between Alice and the White King: "Alice had been asked by the King to look down the road and tell him if she could see his two messengers. 'I see nobody on the road,' said Alice. 'I only wish *I* had such eyes,' the King remarked in a fretful tone. 'To be able to see Nobody! and at that distance too'."

Another objection to this book is that it is too mathematical. By that I do not mean that it is technical but rather that the treatment, to a large extent is nonstatistical. The fact that the elements of an economic time series are random variables, now and then breaks through the crust of his general mathematical treatment of the subject matter. But in the main, the relationships that Davis sets up between economic variables are functional relationships rather than statistical. Professor Davis frequently writes an

equation relating a variable to other quantities, such as time, without making it clear that the relationship is of a statistical nature rather than functional. His definitions of serial correlation, variance of a function, multiple correlations, etc., are purely mathematical and do not refer to any stochastic process. An outstanding example of the rigidity of treatment throughout most of the book is the discussion of the logistic. Davis considers several methods developed for fitting logistic, including that of Professor Hotelling. The main contribution of Professor Hotelling in the treatment of the logistic is not the fact that he has provided a new method of evaluating the constant involved but that he has introduced a new concept in the field of time series analysis. This concept involves the consideration of differential equations with random coefficients. This approach to the problem of economic time series analysis is barely touched upon.

Professor Davis introduces several new ideas. Among them are the concept of energy of a time series, the concept of degrees of freedom in a time series, and a new definition of the probable error of forecast. The concept of energy is equivalent to Fisher's notion of variance. Although this concept, as an analogy borrowed from the physical sciences, is interesting, it is rather doubtful whether it adds more in the actual understanding of the statistical treatment of economic time series than the concept of variance introduced by Fisher. Davis' definition of degrees of freedom in a time series is highly significant but it must be remembered that at best it is a makeshift device. The definition of degrees of freedom in terms of elementary energies is objectionable from a theoretical point of view, not only because it introduces fractional degrees of freedom but because in any given problem the elementary energies must themselves be estimated from a sample and consequently the degrees of freedom become random variables. This approach to the definition of degrees of freedom is in many respects similar to Bartels' approach and suffers from the same shortcomings. Again in his discussion of the standard error of forecast the improvement which Davis introduces in the formula developed by Hotelling and Schultz is noteworthy in that it points a warning to those who wish to extrapolate from a time series. But in the final analysis, his method is no more than a rule-of-thumb criterion based on empirical evidence and not on probability theory.

It is interesting to note that even since the book has gone to press, several advancements have been made in the theory of eco-

nomic time series analysis. Notable among these are Gerhard Tintner's book, *The Variate Difference Method:* a study of tests of significance for randomness by W. Allen Wallis and Geoffrey H. Moore was published by the National Bureau of Economic Research: and, in the same field, articles by John Von Neumann on the Distribution of the Ratio of the Mean Square Successive Difference to the Variance: and an article by R. L. Anderson on the Distribution of the Serial Correlation Coefficient, which have appeared in recent issues of the *Annals of Mathematical Statistics.*

M. A. GIRSHICK

Bureau of Agricultural Economics

Federal Crop Insurance in Operation, J. C. Clendenin, California, Stanford University, Wheat Studies of the Food Research Institute, Vol. XVIII, No. 6. Pp. 62. $1.25.

Although federal crop insurance has been in operation for only three years on wheat only, some important lessons can be learned from the experience to date, and the study by Professor Clendenin is a very timely and thorough one. In addition to explaining the elements of the contract, the actuarial features, and the administrative procedures necessary for a clear understanding of the operation of federal crop insurance, this report analyzes the extent of participation by American wheat growers and the problems which accompany the operating policies followed. More important than these, however, is a very excellent concluding section on observations pointing toward methods by which operation of federal crop insurance can be improved. Inclusion of four brief appendices (a) private experience with crop insurance in the United States, (b) crop insurance in foreign countries, (c) action in Congress and Federal departments prior to 1937, and (d) Federal insurance on crops other than wheat, and seven appendix tables add to the usefulness of the report.

Professor Clendenin points out that in 1940 and 1941 less than one-fifth (17 to 18 per cent) of the wheat acreage seeded was insured. Even after eliminating the 20 to 25 per cent of producers who refused to accept Agricultural Adjustment Administration acreage limitations and thereby made themselves ineligible for crop insurance, and the large number whose acreages are small and those located outside commercial wheat areas who have generally not been urged to insure, the third year's coverage under the crop insurance program approached only about 25 per cent of the ef-

fectively eligible acreage and producers. Preliminary reports for 1942 indicate a considerable increase in insurance volume as well as a gain in the number of contracts.

The author indicates that this relatively small participation is due in large part to the high premium rates in high risk areas. He points out that at the present time crop insurance is not making satisfactory gains in such areas except when stimulated by heavy losses or adverse conditions, and he indicates that assuming no change in the contract or in administrative methods, participation in hazardous areas may increase some from present levels, "but 20 per cent of the available acreage seems as much as can be expected," and even this means a very large increase above 1942 levels. The imposition of wheat marketing quotas, which will bring a substantial number of new prospects into the eligible list, will make it increasingly difficult to attain this percentage of participation.

The study shows that in the first three seasons, wheat crop insurance has entailed a subsidy from the Treasury of at least 28 million dollars for operating expenses and underwriting losses. These have been relatively good years in which reserves against future poor years should have been built up. Intentionally assumed operating expenses have averaged approximately $4,400,000 yearly and underwriting losses have averaged at least another 4 million dollars annually. The author states that these losses are due largely to imperfections in actuarial data and methods, to adverse selection of risks, and to liberal adjustment standards, and not to any basic unsoundness of the underwriting plan itself. "The principle of insurance in kind, the use of the farm as the underwriting basis, the coverage of a fraction of normal yield (50 to 75 per cent), and settlements in grain or local dollar equivalents, are sane and practical ideas. The premium note plan is sensible and inherently workable, and should give little trouble as long as the pledged Agricultural Adjustment Administration payments are continued by the Government, provided a firm collection policy is maintained."

It would seem, therefore, that since the basic underwriting plan is sound, defects in operations to date can be remedied. Adjustment standards have been more liberal than originally contemplated, but the author contends that the major factors contributing to the losses incurred are those arising from imperfect figures and methods and adverse selection of risks. Appraised average yields and

appraised yearly yields (where gaps in annual data were filled in by appraisal) tended to be high, particularly at the beginning of the operation of the program. Appraised loss costs tended to be regularly too low, and errors in historical yield data also produced errors in loss cost. The Agricultural Marketing Service yield estimates in some counties were of doubtful merit, making the ten-year adjustment factor added to the six-year farm yields subject to question. The practice of adding the ten-year adjustments uniformly to all six-year farm yield and loss cost data in the county is perhaps closer to the proper method than proportional adjustments would be, "but it is not as accurate." Material changes have been made in methods of computing insured yields and premium rates after the 1939 experience, and incidentally, the data now accumulating "should make possible a more stable actuarial policy than the present one; but for the present, the need for accuracy supports the immediate use of new annual figures as they become available. The sensitiveness of medium and high premium areas to premium costs and the importance of the tendency to adverse selection where large premium sums are involved require a special emphasis on exactness. In such areas, each farm should be rated exactly in proportion to its chances of loss."

The author also recommends that application deadline dates be reconsidered and that earlier dates be chosen for certain areas where adverse selection has been prominent. The study criticizes the policy of excluding farmers from the insurance program who decline to cooperate with Agricultural Adjustment Administration policies on the grounds that it is both unfortunate and unfair. "Refusal to participate in the Agricultural Adjustment Administration is not moral derelection, nor does it signify the employment of unsound farming practices. . . . Since all farms are alike entitled to the benevolent interest of the Government and since the propagation of the principles of security through insurance requires the maximum participation, it seems to us that the restriction lacks adequate justification." The study condemns the latest change on the board of directors which apparently makes the Farm Crop Insurance Corporation a virtual subsidiary of the Agricultural Adjustment Administration on the grounds that a successful crop insurance program "should be largely separate from current politically debated agricultural policy. . . . Part of the solution may lie in strengthening (as well as stabilizing) the board of directors by including with well-chosen representatives of the Department of

Agriculture at least two competent outsiders. . . . The 'advisory committee' authorized by the present law (but never appointed) could become a very useful factor in the development of the system if redefined in membership and functions." The author recommends an eight-man committee including insurance men, bankers, and economists, as well as farmers.

The report seems to be very fair in its appraisal of present operating procedures and of the experiment of federal crop insurance as a whole. It concludes that while federal crop insurance is not yet equitable enough or essential enough to warrant making participation compulsory, the issue of compulsory participation should nevertheless not be shelved or forgotten. The Government now requires industrial and commercial employees with the aid of employers and the Government to make insurance provision against possible unemployment and for their retirement needs. Likewise the Federal Government may eventually require insurance of all farmers who are certain to experience severe crop losses over a period of years.

The author believes the ultimate possibilities of national advantage from federal crop insurance justify continuation of a subsidy to permit the system to mature, but that vigorous efforts are needed "to keep the burden within more reasonable limits." In this connection four specific aims are proposed: (1) Avoid extending the scheme to other crops until genuine success has been achieved with wheat. (2) Improve the wheat scheme so as to eliminate underwriting losses in good crop years and reduce to a minimum such losses over a period of years. (3) Further reduce operating expenses per protected bushel by various means, including cessation of operations in areas where insurance is not essential or little used. Costs per protected bushel seem unrelated to the hazards of farming. (4) Devise effective procedures for eventually loading premiums with local expenses with the dual purpose of keeping down expenses and lessening the Treasury burden. However, the author indicates that there is no prospect that all of the general overhead expenses can be shifted to the insureds because high risk areas already have heavy net premiums and are sensitive to increases, while low loss areas probably would not feel sufficient need of insurance to pay rates high enough to cover the high operating expenses as well as their loss costs.

The system of advance payments has been dropped in 1942 and the Agricultural Adjustment Administration participant who in-

sures his crop with the Farm Crop Insurance Corporation can give his note for the number of bushels of wheat required for the premium with the note maturing shortly after harvest time and liquidate it either by proceeds from harvest or by use of a loss settlement. Other liberal terms such as requiring no crop lien, charging no interest either before or after maturity, permitting payment to be made at any time in wheat or cash equivalent before maturity, or in cash at maturity-date-wheat-prices after maturity, and requiring no security except assignment of moneys which the Department of Agriculture may pay the insured after maturity of the note, should help the crop insurance program reach the maximum possible clientele at minimum operating cost. The author wisely points out, however, that "The absence of either interest after maturity or penalty for delinquency seems unnecessarily lax, and laxity is one characteristic which the insurance program should avoid."

The idea of utilizing crop insurance reserves as part of ever-normal-granary reserves is considered by the author to be unfortunate and unnecessary. Even though the corporation should consequently assume certain risks from price changes by dropping the utilization of its reserves as part of ever-normal granary reserves, price change risks could be expected to largely average out over a period of years, and at worst, "the net losses would almost certainly be less than the sum of handling and storage charges on wheat reserves and interest lost on potential reserves in bonds." In other words, ever-normal-granary reserves, if they are to be maintained, should be the responsibility of a single federal agency other than the Farm Crop Insurance Corporation, and holding crop insurance reserves in grain would be more appropriate "in the absence of an ever-normal-granary program than as part of one."

With the major conclusions of this report, the reviewer can take little issue. It is a work of thorough study and is presented in a concise and effective manner. It shows throughout a sense of fairness and open-mindedness which is particularly desirable on the part of scholars and research men who are often inclined to be cynical and critical of federal action programs and attempts to improve the economy by eliminating some of the difficulties which are beyond the individual operator's control. The report ends in a very wholesome vein by saying that while federal crop insurance has not yet proved that it can provide enough farm security on a sufficiently equitable and satisfactory basis to justify its cost, it has at the same time not yet proved its inability to do these things. "The goal

for the program is eminently desirable, does not seem improbable of attainment, and justifies experiment with the single crop until the attempt is either successful or proved definitely unlikely to succeed."

R. R. RENNE

Montana State College

Farm Management and Marketing, V. B. Hart, M. T. Bond, and L. C. Cunningham, Ithaca, New York, John Wiley and Sons Inc., Pp. vi, 647. $2.75.

This book, according to the authors, deals with the business problems of farmers and is designed for the use of agricultural students in high schools, junior colleges, technical schools, and colleges. Following an introductory chapter entitled "What is Farming," Chapter II presents an orthodox discussion of "Types of Farming," based upon the 1930 U. S. Census data. The following thirteen chapters in many respects reminds one of the scope and outline of the book *Farm Management* written by the late G. F. Warren. In fact the authors state that the text follows the general point of view developed by Doctor Warren and others who have contributed to the general course in farm management offered at Cornell University.

Through including "anything which affects the income of farmers" the authors have devoted a chapter to each of the following subjects: credit, insurance, use of land, and prices; and about seven chapters to marketing, giving emphasis to the marketing of fruits, vegetables, and dairy products.

Instruction in farm management in different institutions might be said to vary from a presentation of factual data as the basis of teaching to the other extreme of the development of a theory of farm management which will apply to agriculture in general. This text would be classified in the factual group. While the usefulness of the text has been enhanced because the authors drew illustrative material from a considerable number of sources, the data cited for the most part gives the text major usefulness in the Middle Atlantic and New England states.

The agricultural instructional work in many agricultural colleges is divided between departments and courses in such a way that this text in some respects cuts across other courses. Probably few college courses in farm management give much space to marketing, credit, and insurance or technical information on the con-

struction of fences and farm buildings, although such material may be adapted to a high school course in agriculture. In attempting to adapt the text to the use of agricultural students in high schools it is necessarily simplified in statement, and the independent treatment of subjects without a close interrelationship between chapters fits the book for elementary use in high schools where instruction is carried out on the teaching unit basis.

In appraising the text material on farm management, the chapter "Measuring Profits in Farming" does not analyze the merits of various measures as one might expect of a college text. The chapters dealing with the factors affecting farm income have received the most adequate treatment. However, one might expect more emphasis upon the actual relative profitableness of crops, their relative feed value, and the way they fit into rotations. In the discussion of livestock, more analysis might have been given to the size of livestock enterprises and their adaptation to different systems of farming. Perhaps these criticisms have more place in appraising the text for midwestern and southern use than its usefulness in the northeastern states. These comments point to one weakness in the text. Planning the farm business is not presented in a logical well-directed approach to the problem. Many regions are finding that land use must be adjusted to the deterioration and rebuilding of the soil to such an extent that a complete reorganization of the entire farm business is needed. In fact, current data reflects the influence of land use brought about by the soil conservation efforts of the agricultural extension service and federal agencies. Present day instruction in farm management needs to give special attention to dynamic trends which in any sense are reshaping agriculture. Soil conservation is such a trend, and well developed farm planning instruction adapted to the building of a more permanent agriculture should be given an important place in the farm management field.

H. C. M. CASE

University of Illinois

Farm for Fortune and Vice Versa, Ladd Haystead, New York, G. P. Putnam's Sons, 1942. Pp. xiii, 207. $2.50.

The author of this book has served as consultant for city people who desired to farm. The book was written to answer the numerous questions of those urbanites who desire to buy a farm and move to it seeking security, comfort, and prosperity. The author has done

much to take the glamour out of farming for such people and, if they read and understand the book, many of them will be sadly disillusioned.

The book is popularly written and can be read easily in an evening. The hazards and problems of various types of farming are described. Requirements in terms of finances, knowledge, and skill are described for those kinds of farming which city people most frequently contemplate engaging in. Suggestions are offered to guide one in the selection and purchase of a farm.

The dangers of failure in various types of farming are stressed. The only type of farming for a city man which is pictured as reasonably free from hazards is so-called "suitcase" farming of wheat in the western wheat belt. Here the reviewer differs with the author. The author states, in writing of the suitcase farmer, "With the government supporting the market, this man can make a profit and a nice one on even present-day prices." (P. 156.) The only argument against the suitcase farmer advanced by the author is sentiment. Experience with the problems of keeping a plowed field from blowing over into the adjoining state, with shortage of rainfall, the disheartening experiences of seeding four or five crops to harvest one or two, and the other hazards of farming in this region apparently are not familiar to the author. There are sound reasons for discouraging the suitcase farmer without resorting to sentiment.

On the whole, the author has done a good job of debunking the myth of a "little farm well-tilled" as a haven of refuge for the tired city man and his family. The book is one that can be recommended to any city person who lacks farm experience and who is contemplating a retreat to a farm.

W. E. GRIMES

Kansas State College

Prairie Population Possibilities, W. J. Waines. Ottawa Royal Commission on Dominion-Provincial Relations, 1939. Pp. 77 (mimeo).

"The material presented in this review affords no basis for the belief that the presently unexploited resources of the Prairie Provinces are capable of supporting large additions to the present population. This conclusion must be modified by the statement that the discovery of unsuspected resources on a vast scale, a revolution in farm technique, the breeding of a new drought-resistant cereal or grass, a profound change in the western Canadian products or the

evolution of a highly self-contained economy might materially alter the prospects. Assuming a continuation of present factors, however, it appears that the Prairie Provinces will not find it easy in the early future to support their own natural increase, and that any attempt to enhance the population by assisted immigration or land-settlement schemes would probably merely accentuate to that degree the present emigration. A period of adjustment to the climatic experience of the past decade and to the market probabilities of the early future appears inevitable."

Professor Waines bases the above conclusion on (1) an analysis of the physical resources of the western Canadian prairie region, (2) the history of development in the region and the present relation of population to resources, and (3) the assumption that no major change in production techniques or economic conditions will make any large area of submarginal land commercially productive in the near future.

In the introductory chapter, the author points out that the basis for the extraordinary expansion in the Prairie Provinces of western Canada during the past 40 years was "the existence of a vast area of virgin soil, to which could be applied a recently perfected farming technique, during a period when expanding external markets were able to absorb at satisfactory prices a steadily mounting annual production." He goes on to say that "this suggests that the continuation of the upward trend of population, at least in the near future, depends mainly on the extent of the virgin resources still available, and the degree of their accessibility."

In chapter II, the author discusses available resources. He describes the soil and climatic characteristics of the five major soil zones of the prairie region, indicating the location of each, its extent, and the acreage classified as "satisfactory for cultivation," "marginal," and "sub-marginal." Suitability for settlement (cultivation) is defined "in terms of soil and topographical characteristics and not in terms of climate," although there is, of course, a considerable degree of correlation between the two. In addition to a description and classification of physical resources in each major soil zone, data are given relative to present land use, types of farming, and population trends and numbers. These data, together with data relating to physical resources, provide the basis for estimating the possibility of further expansion.

Chapter III is entitled "The Possibilities of Further Economic Expansion and Increases in Population," which is an adequate de-

scription of content. The possibility of further agricultural expansion is dealt with in some detail. In addition, the author briefly examines the possibility of expansion in mining and forestry and population trends in urban centers.

Chapter IV discusses some of the problems of readjustment in the agricultural economy of the Prairie Provinces. Extreme variability of gross farm income due to variations in crop yields and prices, coupled with more or less inflexible costs, presents a major problem. The need is stressed for finding ways and means of introducing greater flexibility into costs and building reserves that may be drawn upon in bad years. Some discussion is given of the situation with respect to the market for wheat, which is, of course, a basic consideration in the economy of western Canada.

Professor Waines's study was prepared for the Royal Commission on Dominion-Provincial Relations. The apparent objective was to paint a broad picture of the basic situation and arrive at a conclusion about the general outlook for the future. This the writer has succeeded in doing, being careful, however, to point out that some of the generalities, while true in broad outline, obscure details which may be extremely important from the standpoint of individuals, groups, or organizations. Professor Waines's report should be of particular interest and use to geographers and land economists.

F. F. HILL

Cornell University

Filipino Plantation Workers in Hawaii, Edna Clark Wentworth, *Studies of the Pacific, No. 7*, San Francisco, American Council of the Institute of Pacific Relations, 1941. Pp. xi, 245. $2.00.

This timely monograph presents a detailed analysis of the earnings and expenditures of 101 Filipino families employed on a large Hawaiian sugar plantation in 1933–34. An intensive study of a small sample rather than a broad survey of many families was deemed necessary because of the lack of household records and because of the illiteracy and "suspiciousness" of many workers. The author concludes that the data "may be accepted as showing the level of living of one group of laboring families, the Filipino, on the wages for unskilled labor paid on the sugar plantations of Hawaii in 1933–34" (p. 13).

In two chapters dealing respectively with the Philippine backgrounds and the characteristics of the migrant families studied in

Hawaii, the revelance of cultural and demographic factors to the analysis of Filipino budgets is clearly, if briefly, presented. The Malayan-Spanish culture characteristic of the traditional social order from which the Filipinos came has emphasized a set of values rather different from those held by "Westerners." The economic role of this value-system is, in part, that of establishing the scale of preferences in terms of which family income is allocated.

The main factual presentation of this study includes an account of the internal organization of the semi-paternalistic factory-farm which is the sugar plantation; detailed data concerning family earnings, purchases, savings and indebtedness; descriptions of many aspects of the attitudes, values, and social organization of the Filipino laborers. The annual plantation earnings of heads of households averaged $498 and the family income, exclusive of perequisites, amounted to $708. Food constituted 34 per cent of the value of living, and over one-third of the families had diets below the usual minimum standards of caloric requirements. The author contends that the distribution of family expenditures cannot be fully understood apart from the distinctive cultural standards of the population; e.g., the relatively heavy expenses for ceremonies and socially obligatory gifts, for musical instruments, and for men's clothing. The conclusion is that, "The income of the Filipino families is not distributed in such a way as to secure maximum physical efficiency. Other values are satisfied before the minimum essentials necessary to provide for physical well being are adequately provided" (p. 216). However, it appears that undue importance is attributed to the competition between "subsistence" and "advancement" items in the budget: expenditures for recreation, for example (including the much-emphasized fiestas), amounted to only 6 per cent of the total "value of living."

The chief value of this work lies in its presentation of concrete data and in its hints as to the direction of further profitable analysis. Its theoretical presentations are quite modest, and there may be some doubts concerning the adequacy of the sample as a basis for generalizations concerning the Hawaiian situation as a whole. Within the limits of its monographic scope, however, this study is a valuable contribution to our understanding of certain aspects of the labor situation under the Hawaiian plantation system.

ROBIN M. WILLIAMS

University of Kentucky

NEWS NOTES

The central office of the Farm Credit Administration was transferred to Kansas City during the week of May 18. The Cooperative Research and Service Division together with a small liaison staff of the other sections of the Administration, including Deputy Governor Warburton, remained in Washington. The Economic and Credit Research Division is represented on this staff by Dr. Walter Bauer.

Arthur C. Bartlett, editor formerly with *This Week, The American* and other magazines, and author, has been appointed Chief of the Marketing Reports Division of the Agricultural Marketing Administration.

Ralph U. Battles, formerly of the staff of War Production Board and the Metropolitan Life Insurance Company, joined the staff of the Economic and Credit Research Division of the Farm Credit Administration on May, 1, 1942, as a Senior Agricultural Economist.

Merrill K. Bennett, Economist and Executive Secretary of the Food Research Institute at Stanford University, returned June 1 after a year in Hawaii as a Guggenheim Fellow. From December to June he served as Chief Statistician of the Territorial Office of Food Control.

Clarence A. Boonstra resigned May 1 as Instructor and Assistant Research Economist, Department of Agricultural Economics, Louisiana State University, to accept a position with the U. S. Bureau of Agricultural Economics.

George E. Brandow, Assistant Professor of Agricultural Economics, The Pennsylvania State College, has taken a leave of absence in order to accept a position with the Insecticide Branch of the Office of Price Administration.

Karl Brandt, Economist and Professor of Agricultural Economics at the Food Research Institute of Stanford University, has been on leave of absence since April 1942 to serve as Economic Adviser to the Secretary of Agriculture in order to assist in shaping wartime food and raw material policies. The Food and Nutrition Board of the National Research Council has appointed him as a member of its Committee on Fats.

Raymond T. Burdick, Associate Agricultural Economist at the Colorado Experiment Station, returned to his duties in this field following a period of nine months of graduate study under a fellowship award at the University of Chicago in cooperation with the Farm Foundation.

Gustave Burmeister, formerly in charge of fruit and vegetable price analysis in the Division of Statistical and Historical Research, Bureau of Agricultural Economics, has transferred to the Office of Foreign Agricultural Relations, Department of Agriculture.

William F. Callander, Head of the Division of Agricultural Statistics, Bureau of Agricultural Economics, transferred on July 1 to become Field Statistician for Florida. In addition to his State work, Mr. Callander will serve as a consultant in the general administration of the Division.

D. A. Clarke, Jr., has been appointed Assistant in Research in Agricultural Economics at Storrs (Connecticut) Agricultural Experiment Station to work on an expanded research program in milk marketing in Connecticut to include city phases of retail distribution.

G. P. Collins, Instructor in Agricultural Economics at the Oklahoma Agricultural and Mechanical College, has received a General Educational Board fellowship for study during the coming year at the University of Illinois.

Maurice R. Cooper, Senior Agricultural Economics Statistician, formerly in charge of the Cotton Price Analysis Unit, Division of Statistical and Historical Research, Bureau of Agricultural Economics, has transferred to the Office of the Quartermaster, War Department.

Harold Cutler, who has been doing graduate work at Iowa State College on sabbatical leave the past year, will return to the Utah State Agricultural College to continue his work in teaching and research during the coming year.

Rex F. Daly has transferred from the Office of Price Administration to do vegetable price analyses in the Bureau of Agricultural Economics.

Louis S. Drake has resigned as State Representative of the U. S. Bureau of Agricultural Economics in Connecticut. He and his brother are raising potatoes in Michigan.

Phil Eckert, Assistant Professor, Department of Rural Economics, Ohio State University, has resigned to accept a position with the Office of Price Administration.

Lippert S. Ellis has resigned his position as Vice-Director of the Oklahoma Agricultural Experiment Station to become Head of the Regional Office of the Division of Land Economics at Little Rock.

W. T. Ferrier, Associate Agricultural Economist in the Department of Agricultural Economics and Rural Sociology at Clemson College, has been granted a leave of absence during which time he will serve as consultant in the Office of Price Administration.

D. A. FitzGerald, former Head of the Division of Program Analysis and Development, Bureau of Agricultural Economics, has been appointed by the Secretary of Agriculture as Head of the Division of Food Requirements in the Office of Agricultural War Relations. In his new position, Dr. FitzGerald will have charge of the statistical and "figure" work for the Food Requirements Committee of the War Production Board.

Herbert C. Fowler recently transferred from the Division of Farm Management and Costs, Bureau of Agricultural Economics, to the Materials Division of the War Production Board.

E. W. Gaumnitz, Associate Administrator, Agricultural Marketing Administration, has transferred to the Board of Economic Welfare; the vacancy created by the transfer of Dr. Gaumnitz will not be filled.

Leo O. Giffey was appointed Assistant in Agricultural Economics in the Division of Farm Management and Agricultural Economics of the Washington Agricultural Experiment Station, effective February 1, 1942. He is conducting a research on the marketing of livestock in Washington.

John H. Haggerty, In Charge, Land Utilization Section, Division of Land Economics, Bureau of Agricultural Economics, spent the month of May in Puerto Rico on a consultant assignment to the National Resources Planning Board. Mr. Haggerty assisted both Federal and Insular agencies in organizing an agricultural planning committee for Puerto Rico and charting the course for its activities for the coming year. A unified approach to the problems of Puerto Rico will be attempted by the Puerto Rico Agricultural Planning Committee.

Charles M. Hardin of the Department of Government is devoting part of his time to collaboration with Professor John D. Black in the seminar on Agricultural Policy in the Harvard School of Public Administration.

E. M. Hughes, Assistant Professor, Agricultural Economics Extension at the University of Illinois, has accepted the position of fieldman for the Farm Bureau Management Service in a new area organized in Northeastern Illinois. His headquarters are at Woodstock, Illinois.

J. Russell Ives has taken over the major portion of the livestock price analysis work of the Bureau of Agricultural Economics, following the transfer of Preston Richards to the Agricultural Marketing Administration.

D. R. Jenkins, Assistant Rural Sociologist in the Department of Agricultural Economics and Rural Sociology at Clemson College, is teaching during the summer at New York City College.

R. T. Klemme, Associate Professor at the Oklahoma Agricultural and Mechanical College, was on temporary leave until July 1 working with the National Resources Board at Dallas.

Hildegarde Kneeland, who was studying income distribution and consumer demand in the Division of Statistical and Historical Research, Bureau of Agricultural Economics, is now Chief of the Consumer Income and Demand Section, Division of Research, Office of Price Administration.

Charles F. Kunkel, formerly Associate Chief of Agricultural Marketing Administration, succeeded James D. LeCron as Chief of the Distribution Branch when LeCron joined the Office of the Coordinator of Inter-American Affairs.

W. G. Lee, Assistant in Agricultural Economics at the University of Illinois, has gone to Boise, Idaho, in connection with the Cooperative Crop and Livestock Reporting Service.

Herschel W. Little resigned May 15 as Assistant Research Economist in the Department of Agricultural Economics, Louisiana State University, to accept a position with the Division of Marketing and Transportation Research in the U. S. Bureau of Agricultural Economics.

Frederick C. McMillen, formerly Chief of the Surplus Marketing Administration's Personnel Division, was appointed Chief of the Agricultural Marketing Administration Personnel Division, succeeding Leland E. Barrows.

John E. Mason has transferred from a field position in the Bureau of Agricultural Economics to Washington, D. C., where he is now an Agricultural Economist in the Agricultural Adjustment Agency.

W. G. Meal, formerly head of the Fruit and Vegetable Division of the Agricultural Marketing Service, has been named Chief of the Fruit and Vegetable Branch of the Agricultural Marketing Administration.

Albert I. Meyers is now working in the Division of Marketing and Transportation Research, Bureau of Agricultural Economics, having transferred from an advisory position in the national office of the Farm Bureau Federation.

Clyde Mitchell, who has been attending Harvard University during the past year under a Littauer Fellowship, has accepted the position in charge of research in the Dallas region of the Farm Security Administration.

Herbert W. Mumford, Jr., Agricultural Economist, formerly with the Cooperative Research and Service Division of the Farm Credit Administration, transferred to the staff of the Economic and Credit Research Division on May 7, 1942.

W. G. Murray of Iowa State College is teaching a special three weeks course in farm management during the summer quarter at the College of Agriculture, Fayetteville, Akransas.

Frederick L. Newhouse, formerly with the Surplus Marketing Administration, joined the staff of the Economic and Credit Research Division on March 31, 1942, as a Junior Agricultural Economist.

W. H. Nicholls returned to Iowa State College in June, after spending the academic year in advanced study of the price and production policies of the meat packing industry at the University of Chicago, under a post-doctoral fellowship of the Social Science Research Council.

Otie M. Reed, formerly Chief of the Dairy Division, Surplus Marketing

Administration, has been appointed Chief of the Program Appraisal Division, Agricultural Marketing Administration.

Preston Richards, livestock price analyst, has transferred from the Division of Statistical and Historical Research, Bureau of Agricultural Economics, to the Agricultural Marketing Administration.

Waldo S. Rowan has been appointed acting Assistant Agricultural Economist, University of Tennessee, for the duration of the emergency.

L. W. Schruben, Assistant in Agricultural Economics at the University of Illinois, has accepted a position with the Agricultural Marketing Administration in Washington, D. C.

L. H. Simerl, Associate in Agricultural Marketing Extension at the University of Illinois resigned March 15 to become director of the Department of Research and Taxation of the Illinois Agricultural Association. His headquarters are in Chicago.

M. G. Smith has resigned from his position with the Department of Agricultural Economics at Purdue University to accept a position as Assistant Agricultural Attache at Mexico City. In his new work he is working with the U. S. State Department.

T. G. Stitts, Chief of Cooperative Research and Service of the Farm Credit Administration, has been designated Chief of the Agricultural Marketing Administration Dairy and Poultry Branch.

Porter Taylor, formerly Chief of the Fruit and Vegetable Division of the Surplus Marketing Administration (now incorporated in the Agricultural Marketing Administration) has left the Department of Agriculture to become general manager of the Cooperative Fruit and Vegetable Association.

Ben H. Thibodeauz has returned to Washington after a 6-month survey trip to Bolivia in a party organized by the Coordinator of Inter-American Affairs.

Robert M. Walsh now holds the position formerly held by Preston Richards in the Bureau of Agricultural Economics, but devotes most of his attention to fats and oils price analysis.

B. S. White, Jr., has resigned as Assistant Professor of Agricultural Economics at the University of Kentucky to accept a position of Senior Agricultural Economic Statistician in the Division of Historical and Statistical Research, U. S. Bureau of Agricultural Economics.

E. C. Young became Dean of the Graduate School at Purdue University, July 1, 1942. Dr. Young also continues as Professor of Agricultural Economics at Purdue University. He has served as Assistant Dean of the Graduate School for the past eight years.

CIVIL SERVICE EXAMINATION CLOSED TO ECONOMISTS

The United States Civil Service Commission gave notice that the closing date for receipt of applications for Economist (Any Specialized Branch), all grades, was May 29, 1942. Applications must have been filled with the Civil Service Commission, on or before that date.

Additional needs for persons experienced in particular branches of economics will be made known by the issuance of special bulletins or circulars covering such specialized personnel requirements.

HONOR ROLL

Agricultural Economists in the Armed Services of the United States

Atchley, Frank M.	Mich. State College	Army
Bell, William E.	Bur. Agri. Econ. USDA	Army
Bertrand, Alvin L.	Louisiana State University	Army
Binkley, Wendell C.	Bur. Agri. Econ. USDA	Army
Bishop, Leslie J.	Bur. Agri. Econ. USDA	Army
Burgess, John S., Jr.	Farm Credit Admn.	Army
Cake, Edwin W.	Farm Credit Admn.	Army
Charles, Ralph	Bur. Agri. Econ. USDA	Army
Coleman, William J.	Bur. Agri. Econ. USDA	Army
Cuthbert, Clarence T.	Farm Credit Admn.	Army
Doneth, John C.	Mich. State College	Army
Engelbert, Ernest A.	Bur. Agri. Econ. USDA	Army
Elliott, Robert T.	Colo. State College	Navy
Etter, Earl T.	Bur. Agri. Econ. USDA	Navy
Fippin, William H.	Bur. Agri. Econ. USDA	Army
Firor, J. William	Univ. of Georgia	Army
Fluke, William J.	Bur. Agri. Econ. USDA	Army
Gibson, J. W.	Bur. Agri. Econ. USDA	Army
Grove, Ernest W.	Bur. Agri. Econ. USDA	Army
Haren, Claude C.	Bur. Agri. Econ. USDA	Army
Hall, Orville J.	Univ. of Arkansas	Army
Harrison, I. Keith	Bur. Agri. Econ. USDA	Army
Herrling, Stanley	Bur. Agri. Econ. USDA	Army
Hill, Leonard M.	Bur. Agri. Econ. USDA	Navy
Hill, Roderic Lee	Bur. Agri. Econ. USDA	Army
Hochmuth, Harold	Bur. Agri. Econ. USDA	Army
Hodge, Frederick M.	Bur. Agri. Econ. USDA	Navy
Holcomb, Gordon V.	Bur. Agri. Econ. USDA	Army
InMasche, Francis W.	Farm Credit Admn.	Army
Jones, Lloyd E.	Bur. Agri. Econ. USDA	Army
Kinard, Joe D.	Clemson College	Army
Koeller, Harold	Bur. Agri. Econ. USDA	Army
Laborde, L. P.	Bur. Agri. Econ. USDA	Army
LaFleur, A. H.	Bur. Agri. Econ. USDA	Army
Landstrom, Karl S.	Bur. Agri. Econ. USDA	Army
Leith, Gordon W.	Farm Credit Admn.	Navy
Leland, Edward	Bur. Agri. Econ. USDA	Navy
Loomer, Charles W.	Bur. Agri. Econ. USDA	Navy
McPherson, Woodrow	Bur. Agri. Econ. USDA	Army
Marshall, Raymond	Okla. A & M College	Army
Melcher, Robert L.	Bur. Agri. Econ. USDA	Army
Miller, J. M.	Bur. Agri. Econ. USDA	Army
Miller, Keith H.	Colo. State College	Army

Murphy, W. N.	Bur. Agri. Econ. USDA	Navy
Neal, T. Ellison	Farm Credit Admn.	Navy
Peasley, John H.	Bur. Agri. Econ. USDA	Navy
Peterson, George	Bur. Agri. Econ. USDA	Army
Pierce, Walter H.	Bur. Agri. Econ. USDA	Army
Pike, Clarence E.	Farm Credit Admn.	Army
Raskopf, B. D.	Univ. of Tennessee	Army
Ratcliffe, Russell S.	Bur. Agri. Econ. USDA	Navy
Rawlings, Brown R., Jr.	Bur. Agri. Econ. USDA	Army
Riley, Ernest	Clemson College	Army
Ross, John E., Jr.	Bur. Agri. Econ. USDA	Navy
Sant, Paul T.	Bur. Agri. Econ. USDA	Army
Shumate, Ralph	Okla. A & M College	Navy
Stewart, Clyde E.	Bur. Agri. Econ. USDA	Army
Stokstad, Christian	Bur. Agri. Econ. USDA	Navy
Strand, Norman V.	Bur. Agri. Econ. USDA	Army
Sutton, Franklin P.	Bur. Agri. Econ. USDA	Army
Verlander, Walter C., Jr.	Louisiana State University	Army
Wilcox, Keith M.	Bur. Agri. Econ. USDA	Army
White, Orville H.	Farm Credit Admn.	Army